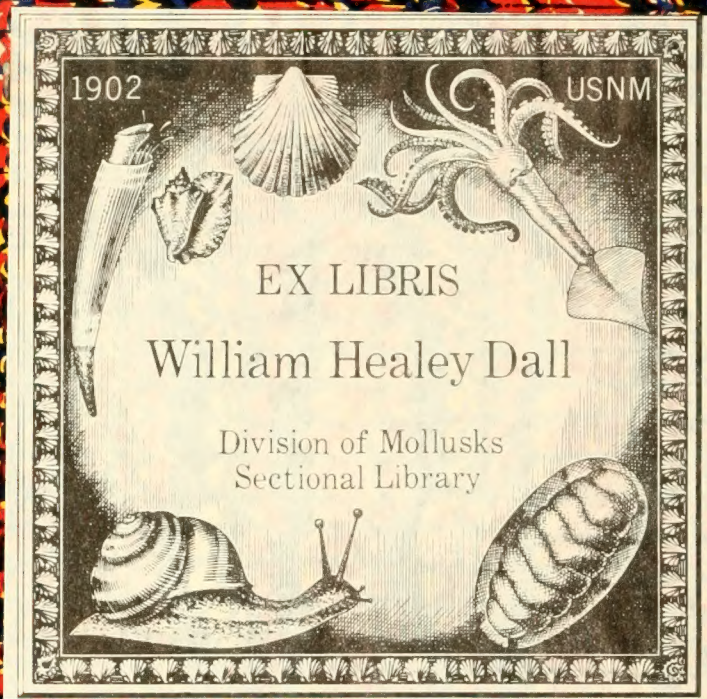


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Land & fresh water shells

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H SYKES

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[From Fauna Hawaiiensis, Vol. II., 1900.]

Pt. 4 -

Sykes









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## MOLLUSCA.

By **E. R. Sykes,**

WITH INTERCALATIONS ON ANATOMY

By **Lt.-Col. Godwin-Austen.**

Division of Mollusks  
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*Contents.* § 1, *General remarks*, p. 271; § 2, *Systematic account*, p. 275; § 3, *Bibliographic list*, p. 400; § 4, *Alphabetical list of names placed as synonyms*, p. 407; § 5, *Alphabetical list of unidentified or erroneously recorded names*, p. 412.

THE material upon which this study of the land and fresh-water Mollusca is based, in addition to the collection formed by Mr Perkins, consists in a great measure of the collection in the British Museum (Natural History), where the bulk of Newcomb's and Pfeiffer's type-specimens are to be found. Thanks to the kindness of Prof. A. Hyatt, an examination has been made of the type-specimens of the species described by Gulick, of the genus *Leptachatina*, and now preserved at Boston. Mr D. D. Baldwin, of Maui, has also very kindly sent over a number of specimens and Mons. Ancey has lent the types of some species described by him. A collection formed in the Islands by Mr Hutchison has also been placed in my hands for examination by Mr Fulton.

Lt.-Col. H. H. Godwin-Austen, F.R.S., has enabled me to add to the interest of this work in a great degree, by very kindly dissecting some of the species and permitting me to incorporate here the results; it is hoped that he may be able to give a further account of the anatomy in the *Achatinellidae*.

To Mr Edgar A. Smith, I desire, in conclusion, to express my most grateful thanks for his unfailing help and courtesy.

### § 1. General Remarks on the Mollusca.

To the student of the Mollusca, the Hawaiian Islands fauna is probably more familiar by name than that of many better known places, owing to the occurrence there of the well-known Achatinelloid group of forms.

Tables of the distribution of the fauna are given below, but a few general remarks here may be of interest.



The Limacidae yield nothing very peculiar or very striking and the few forms peculiar to the Islands may well have been developed from introduced European ancestors.

The Zonitidae are scattered over the Islands; all are peculiar, but they are nearly related to forms found in other islands of the Pacific: similar remarks apply to the Endodontidae, one group of which (*Pterodiscus*), however, appears to be peculiar.

The presence—and that strongly contested—of only a single indigenous species of the Helicidae again indicates affinities with Polynesia.

The Pupidae as a family, have a very wide geographical range, and hence no deductions can be drawn from their presence; it should be noted that here—if the identification be correct—the fauna includes a species not peculiar to the Islands.

With reference to the Achatinellidae it may at once be noted that several divisions of the family may be made. First, the brightly coloured forms which fall into the genus *Achatinella* proper and which are replaced in the Southern Pacific Islands by the genus *Partula*. The metropolis of distribution of all these forms seems to be Oahu, save in the case of the subgenus *Partulina* when Maui and Molokai appear to divide the honour. No species has been found on Kauai and only two on Hawaii at the other end of the group. Species have been described by authors upon coloration and band-formations; in my opinion numbers even of the 'species' here admitted will prove, when their anatomy is carefully investigated, to be varying forms of one common species. Consider, for example, such a shell as *Tachea nemoralis* dealt with in the same manner as the Hawaiian forms have been! Still, even when reductions are made, the fauna will remain remarkable for its numerical strength in species.

Secondly, passing through *Perdicella* and *Newcombia*, confined to the islands of Molokai and Maui, we come to the second great division, typified by *Leptachatina* and *Amastra*. Here, while the metropolis again seems to be Oahu, Kauai, the oldest island geologically considered, ranks well with the rest.

Thirdly, passing through the interesting and recently described *Thaanumia* of Oahu, we come to *Carelia*, which is confined to Kauai save for one subfossil species on the Island of Niihau (the only mollusc on that island).

Fourthly, we have the little group of *Auriculella* and *Frickella*, which leave the impression that they are linking forms between *Achatinella* and *Tornatellina*, and, again, belong in the main to Oahu. It should be borne in mind, as illustrating the peculiarity of the fauna, that only about half a dozen out of, approximately, 330 species of Achatinellidae are found on more than one island, and indeed some of these may be due to errors of identification. In our present state of knowledge a faunal list is largely influenced by the 'personal equation' of the writer.

From the residue of the fauna but little is to be learnt; the development of *Succinea* appears abnormal and further research will probably reduce the so-called 'species' of this group.



The following general conclusions may, however, be drawn :

1. The Molluscan fauna is nearly related to that of the Polynesian islands, and shows hardly any trace of continental influence, Asiatic or American.
2. The species are nearly always confined to one island ; but it is very doubtful if, as has been stated, "each valley has its peculiar species."
3. When the genera found are confined to the islands, the majority of living species usually occur on Oahu.

I give below tables of distribution ; but, owing to the fauna being so restricted in distribution, have not added percentages of peculiar species.

(1) Families Limacidae, Zonitidae, Endodontidae, Helicidae, Pupidae.

Species peculiar to one Island.

	Limacidae.	Zonitidae.	Endodontidae.	Helicidae.	Pupidae.	Total.
Kauai		3	8			11
Oahu		7	3		4	14
Molokai		1	1			2
Lanai	1	2				3
Maui	1	5	2			8
Hawaii	1	3	1	1	2	8

Species occurring in more than one Island.

Limacidae. Two species (*L. gagates* and *Agriolimax laevis*) are found elsewhere, and may have been introduced. One species is common to Kauai and Maui, one to Maui and Hawaii, and one to Kauai, Oahu, and Maui.

Zonitidae. One species common to Kauai, Oahu, and Maui ; one to Oahu, Molokai, and Lanai ; and one, respectively, to Kauai and Maui, Maui and Oahu.

Philomycidae. One found in Kauai, Oahu, and Hawaii, and one in Oahu only ; these species, however, are not peculiar to the Hawaiian fauna.

Endodontidae. Two species are common to Kauai and Oahu ; one, respectively, to Kauai and Lanai, Maui and Oahu, Lanai and Oahu, Lanai and Molokai ; while three are of uncertain habitat.

Helicidae. One species—introduced—in Kauai and Oahu.

Pupidae. One in Kauai, Oahu, and Hawaii ; one, respectively, in Kauai and Oahu, Oahu and Hawaii ; further, a single species is found outside the Islands.



(2) Achatinellidae. In view of their interesting characters I have here dealt with the distribution by genera.

Species occurring in only one Island.

	ACHATINELLA group.											
	<i>Achatinella</i> s.s.	<i>Bulinella</i> .	<i>Partulina</i> .	<i>Achatinellastrum</i> .								
Kauai							7	15		8	1	31
Oahu	17	19	1	29			40	33	1		10	150
Molokai			9	2	3	8	15	3			2	42
Lanai			3				12	5				20
Maui			16	3	5	1	17	4			1	47
Hawaii			2				3	7			1	13

The only forms of Achatinellidae found on more than one island are in the genera *Leptachatina* and *Auriculella*; in the former one species is said to be found on Kauai and Oahu, and two on Maui and Oahu; in the latter similar notes occur with regard to Oahu and Maui, Molokai and Lanai, Maui and Molokai, and (doubtfully) Oahu and Hawaii.

Further a single subfossil species of *Carelia* is recorded from Niihau; and the following are of uncertain habitat: *Bulinella* 1, *Partulina* 3, *Achatinellastrum* 1, *Amastrea* 7, *Leptachatina* 6, and *Auriculella* 2.

(3) The residue of the fauna.

Species occurring in only one Island.

	<i>Tornatellina</i> .	STENOXYRIDAE.	<i>Succinea</i> .	LIMNAEIDAE.	<i>Melania</i> .	<i>Paludetrina</i> .	<i>Helicina</i> .	<i>Neritina</i> .	Total.
Kauai	3		3	2					8
Oahu	1		2	3	1	1	3		11
Molokai									0
Lanai	1		1						2
Maui	3		4	1	1				9
Hawaii	2	1	12	1					16



Species occurring in more than one Island.

*Tornatellina*. One species, said to be found in Oahu, occurs in the Tonga Islands. Two species are common to Kauai and Oahu, one to Hawaii and Oahu, and one to Kauai, Oahu, and Hawaii.

Stenogyridae. *Opeas juncens* is said to be found in all the Islands, and both this and *O. prestoni* (Hawaii) occur elsewhere. One species is of uncertain habitat.

*Succinea*. Two species in Oahu, Molokai, and Hawaii; one in Lanai, Oahu, and Maui; one in Kauai and Hawaii, one in Maui and Molokai.

Limnaeidae. One species in 'all the Islands'; one in Kauai and Oahu, one in Oahu and Maui; three of uncertain habitat.

*Melania*. One common to Kauai, Oahu, Maui, and Molokai; one to Kauai and Oahu; one to Kauai and Molokai; one of uncertain habitat.

*Helicina*. One common to Kauai, Oahu, Lanai, and Molokai; one to Maui and Lanai.

*Neritina*. One common to Maui, Oahu, and Hawaii; two of uncertain habitat. Two said to be found in 'all the Islands.'

These three tables show that Kauai has 50 species peculiar to it, Oahu 175, Molokai 44, Lanai 25, Maui 64, Hawaii 37.

## § 2. Systematic account of the fauna.

### Fam. LIMACIDAE.

#### *Amalia* Moquin-Tandon.

*Amalia* M.-T. Hist. Moll. France, 1855, II. p. 19 [first species *Limax gagates*, Drap.].

*Milax* Gray, Cat. Pulm. Brit. Mus. 1855, p. 174 [has the same type; there are, also, older names supposed to be identical, but founded on erroneous characters or improperly described].

While dealing with slugs it may be convenient to note that Semper has recorded a species stated to be very near *Limax tenellus* Nilsson; further Dr Cooper is said to have seen a species of *Janella* from these islands, but I have been unable to trace his note from the reference given (see Collinge, P. Malac. Soc. London, II. p. 50).

#### (1) *Amalia babori* Collinge.

*Amalia babori* Collinge, P. Malac. Soc. London, II. (1897), p. 294.

HAB. Maui, at 5000 ft., Haleakala.—Hawaii, 2000 to 4000 ft., Olaa to Kilauea (Perkins).



(2) *Amalia gagates* Draparnaud.

*Limax gagates* Draparnaud, Tabl. Moll. France, 1801, p. 100; Hist. Moll. France, 1805, p. 122, pl. IX. figs. 1, 2.

*Amalia gagates* Drap., Collinge, P. Malac. Soc. London, II. p. 49.

HAB. Maui (Perkins).

## AGRIOLIMAX Mörch.

*Agriolimax* Mörch, J. Conchyl. XIII. (1865), p. 378.

As to the correct name for this genus, see Cockerell and Collinge, Conchologist, II. pp. 199, 200.

(1) *Agriolimax bevenoti* Collinge.

*Agriolimax bevenoti* Collinge, P. Malac. Soc. London, II. (Nov. 1897), p. 295.

HAB. Kauai, at 4000 ft.—Oahu, 2000 ft., Honolulu.—Maui, 5000 ft., Haleakala (Perkins).

(2) *Agriolimax globosus* Collinge.

*Agriolimax globosus* Collinge, P. Malac. Soc. London, II. (April 1896), p. 47.

HAB. Hawaii, Mauna Loa (Perkins).

(3) *Agriolimax laevis* Müller.

*Limax laevis* Müller, Hist. Vermium, II. (1774), p. 1.

*Agriolimax laevis* Müller, Collinge, P. Malac. Soc. London, II. p. 295.

HAB. Kauai, at 2000 ft., Lihue.—Maui, 5000 ft., Haleakala (Perkins).

(4) *Agriolimax perkinsi* Collinge.

*Agriolimax perkinsi* Collinge, P. Malac. Soc. London, II. (April 1896), p. 47.

HAB. Lanai, at 2000 ft. (Perkins).

(5) *Agriolimax* (?) *sandwichiensis* Souleyet.

*Limax sandwichiensis* Souleyet, Voy. Bonite, Zool. II. (1852), p. 497, pl. XXVIII. figs. 8—11 [animal and shell].

HAB. Hawaiian Islands (?).

It seems uncertain whether this be really Hawaiian, or even accurately represented; see Collinge, P. Malac. Soc. London, II. p. 46.



## Fam. ZONITIDAE.

## GODWINIA, n. gen.

This new genus is proposed for the *Vitrina caperata* of Gould, which has, of recent years, usually been placed in *Helicarion*; it will be seen from the valuable anatomical notes of Lt.-Col. Godwin-Austen that there are differences which separate the species from that genus. Probably the *Vitrina tenella* of Gould also belongs here. The types of *Helicarion* Férussac (Tabl. Moll. 1821, pp. xxxi, 24) appear to have been the Australian forms *freycineti* and *cuvieri*.

(1) *Godwinia caperata* Gould.

*Vitrina caperata* Gould, P. Boston Soc. II. (1847), p. 181; U. S. Explor. Exped. Moll. 1856, pl. I. fig. 9.

*Helix newcombi* Pfeiffer, P. Zool. Soc. London, 1854 (Jan. 1855), p. 51; Reeve, Conch. Icon. *Helix*, pl. CLXXXIX. fig. 1321.

Plate XII. figs. 6—12.

HAB. Kauai (Gould, Perkins).—Oahu (Pfeiffer).

Very possibly the habitat of 'Oahu' is a mistake.

"The animal is dark, with a rather broad pale pallial margin; foot with a well defined central area beneath; the specimen was so much contracted that the mucous gland could not be decisively made out; from analogy, however, one should be present. There are no shell-lobes, the mantle-edge is curved and well defined. The right dorsal lobe is small, and the left lobe is long, narrow, and continuous.

"The visceral sac has three coils. The buccal mass has a strong, broad, muscle on the lower posterior side; the oesophagus is short, leading into a very capacious stomach; the salivary gland is in one compact, rounded mass. Jaw solid, dark sienna in colour, with a very straight cutting edge; odontophore long and narrow, with a few large median teeth; at first sight these centrals appear to be simple and straight-sided in form, and they are very nearly so, but closer examination shows that the centre and adjoining teeth have very small notches on the outer side; these are not cusps. The laterals are all curved and aculeate. The dental formula is:

$$18-5-1-5-18$$

$$23-1-23$$

Unfortunately the generative organs were not seen by me, all this portion being lost during dissection, as will sometimes occur in these small species.



"It will be seen from the above characters that this species cannot be placed in the Helicarionidae—the absence of shell-lobes forbids this. Aculeate laterals are hardly ever met with even in the genera of Zonitidae possessing shell-lobes; I can only recall one species, *Macrochlamys castaneolabiata*. The solid jaw, divided foot, and, in all probability, the presence of a mucous gland place it in the Zonitidae. In so many points is it distinct from any of the Indian and Malayan forms that I am acquainted with that I the more regret that the generative organs have still to be made out" (H. H. Godwin-Austen).

(2) *Godwinia* (?) *tenella* Gould.

*Vitrina tenella* Gould, P. Boston Soc. II. 1847, p. 181; U. S. Explor. Exped. *Moll.* 1856, pl. 1. fig. 10.

HAB. Kauai (Gould).—Maui, Haleakala, 5000—9000 ft. (Perkins).

The specimens found by Mr Perkins appear to be identical with Gould's species, which, so far as I can trace, has not been rediscovered on Kauai. In fresh specimens the lip is margined with black.

VITREA Fitzinger.

*Vitrea* Fitz., Beitr. Landeskund. Oesterr. III. p. 99.

Fitzinger's type, as I understand him, was *diaphana* Studer.

Until the anatomy of these Hawaiian species is known, I can suggest no better reference than to the present genus.

(1) *Vitrea lanaiensis* Sykes.

*Vitrea* (?) *lanaiensis* Sykes, P. Malac. Soc. London, II. (1897), p. 298.

Plate XI. figs. 43, 44.

HAB. Lanai, mountains behind Koele (Perkins).

(2) *Vitrea molokaiensis* Sykes.

*Vitrea* (?) *molokaiensis* Sykes, P. Malac. Soc. London, II. (1897), p. 298.

Plate XI. figs. 45, 46.

HAB. Molokai, forest above Pelekunu (Perkins).



(3) *Vitrea pauxillus* Gould.

*Helix pusillus* Gould, P. Boston Soc. II. 1846, p. 171 [*non H. pusilla*, Lowe, 1831].

*Helix pauxillus* Gould, U. S. Explor. Exped. *Moll.* p. 40, pl. III. fig. 46.

*Hyalinia baldwini* Ancey, Bull. Soc. Malac. France, VI. 1889, p. 192; Sykes, P. Malac. Soc. London, III. pl. XIII. figs. 1—3.

HAB. Maui (Gould); West part of Maui (Ancey); Haleakala, 5000 feet (Perkins).  
See, for a note on the synonymy, P. Malac. Soc. London, II. p. 298.

## PSEUDOHYALINA Morse.

The original type was, I gather, *Helix exigua* Stimpson.

(1) *Pseudohyalina kawaiensis* Pfeiffer.

*Helix kawaiensis* Pfeiffer, P. Zool. Soc. London, 1854 [1855], p. 52; Reeve, Conch. Icon. *Helix*, sp. 1256.

HAB. Kauai (Pfeiffer).—Maui and Oahu (Baldwin).

I follow M. Ancey in the generic reference, as I do not know how, at present, the nomenclature may be bettered.

## MICROCYSTINA Mörch.

Type *Nanina rinkii*, Mörch.

(1) *Microcystina* (?) *cryptoportica* Gould.

*Helix cryptoportica* Gould, P. Boston Soc. II. (1846), p. 20; U. S. Explor. Exped. *Moll.*, pl. v. fig. 72.

HAB. Oahu (Pease, Baldwin).

I place this here as the description states "columella valde intorta."

## MICROCYSTIS Beck.

For a discussion as to the type, see P. Malac. Soc. London, II. pp. 130—2.



(1) *Microcystis chamissoi* Pfeiffer.

*Helix chamissoi* Pfeiffer, P. Zool. Soc. London, 1855, p. 91; Bland and Binney, Ann. Lyc. New York, x. p. 338, pl. xv. fig. 3 (jaw and radula; copied in Ann. New York Ac. III. pl. xvii. fig. O).

HAB. Kauai, Waioli and Haena (Baldwin); Makawele and Mountains above Waimea (Perkins).

Bland and Binney give "W. Maui" on the authority of Newcomb, but this seems very dubious; Mons. Ancey gives Oahu, but I think this must be an error. The figures in the *Manual of Conchology* (Vol. II. pl. xxxviii. figs. 74—6) are not good.

## PHILONESIA, gen. nov.

Recently<sup>1</sup>, I discussed the genus *Microcystis* Beck, and expressed the opinion that these small Zonitoid forms so characteristic of the Hawaiian Islands, and scattered over the Islands of the Central Pacific, could not be placed in that genus. I, further, referred them to *Macrochlamys*, stating that "whether our small forms are in accord with the typical group of this genus anatomically, remains to be proved; but, conchologically, they only appear to differ in size."

Specimens of a form which I refer to the unfigured *Microcystis baldwini* Ancey, and which were collected by Mr Perkins, contained the animal, and Lt.-Col. Godwin-Austen has most kindly made an examination of it. His full report will be found on p. 281, but I may here summarize it by saying that this species does not belong to *Macrochlamys* at all, and the query I suggested has been answered. He points out its affinity to *Sitala* and *Kaliella* and here it is interesting to note that Mr Perkins found a species in the Hawaiian Islands that I have referred to the latter genus.

Under these circumstances, and as the shells are distinct by the conchological characters of the columella from both *Microcystina* and *Lamprocystis*—anatomically, also, from the former—I have ventured to create a new genus and propose to take *Microcystis baldwini* Ancey, as the type. Probably the bulk of the Hawaiian Zonitoid forms belong to this group.

(1) *Philonesia abceillei* Ancey.

*Microcystis abceillei* Ancey, Bull. Soc. Malac. France, vi. (1889), p. 199.

HAB. Molokai (Ancey); Mapulehu (Baldwin); wet forest above Pelekunu (Perkins).—Oahu, Waianae Mts. (Perkins).—Lanai (Perkins).

All the specimens are young, but I cannot sever them from this species.

<sup>1</sup> P. Malac. Soc. London, II. p. 130.

(2) *Philonesia baldwini* Ancey.

*Microcystis baldwini* Ancey, Bull. Soc. Malac. France, vi. (1889), p. 204. Plate XII. figs. 1—5.

HAB. Oahu and west part of Maui (Ancey); Head of Panoa Valley, Nuuanu, and Honolulu Mts. (Perkins).

"The animal is brown; spotted and splashed with pure white (Plate XII. fig. 1 a) on the integument which covers the branchial chamber and visceral sac, these markings shew clearly through the transparent shell and give it a very pretty, mottled appearance. The extremity of the foot is truncated; with a mucous gland. In the specimen examined the foot (Plate XII. fig. 2) is very much contracted, but there is every indication that a small lobe overhangs the mucous gland. The foot, which is regularly segmented, has a central area (Plate XII. fig. 2 a); the pallial margin appears unusually broad, but this is deceptive and due to the extreme lateral contraction undergone; the two grooves above are similarly widened. The mantle edge has a well-developed, tongue-like, right shell lobe near the respiratory orifice, with an indistinct, narrow, left shell lobe. The right dorsal lobe is black and well developed, the left paler and moderately broad. Tentacles black.

"Plainly seen through the shell were four embryonic shells, lying one behind the other in the uterus, in various stages of development. The enveloping integument is transparent and so thin that the small shells, being comparatively heavy bodies, very readily break away, and the spermatophore adjacent was not made out.

"The odontophore has a formula of

$$30 : 9 : 1 : 9 : 30$$

$$39 : 1 : 39.$$

"The basal plates of the central teeth are quadrate in outline. The central tooth is tricuspid, the side cusps basal, blunt; the central point with convex sides. The median teeth have a blunt cusp only on the outer basal side, the ninth tooth is a narrower basal plate and is intermediate in form, the next eighteen being curved and bicuspid; the most interesting character is seen at this part of the row, for all the succeeding and outermost teeth are tricuspid, occasionally with even four points. The radula is remarkable for the similarity of the outermost teeth to those of *Kaliella barrakpurensis*<sup>1</sup>; those of *Sitala attega* and *S. infula*<sup>2</sup> should also be compared, in which latter the pectiniform teeth are seen on the whole length of the row. The present shell shows an approach to *Kaliella* in a few of the outermost laterals, but it

<sup>1</sup> Land and F. W. Moll. India, i. pp. 19, 20, pl. v. fig. 11.

<sup>2</sup> Tom. cit. pl. VIII. figs. 1 e & 2 e, after Stoliczka.



must be noted that the median teeth have a single outer cusp, while *Kaliella* has both outer and inner cusps; this latter characteristic is, however, not present in *Sitala*. *Kaliella* has few teeth in the row, *Sitala* many; 33 : 1 : 33, 153 : 1 : 153, respectively. A more important link with the genus *Sitala* is displayed by the presence of right and left shell lobes, which *Kaliella* does not possess; the close parallel lines of contraction across the right shell lobe shew that it has considerable extension in life. Stoliczka also mentions in *Sitala infula* the swollen uterus and the advanced state of development of the ova; pointing to similar embryonic stages in these molluscs. Yet another character is in common, namely, the absence of any amatorial organ. The male organ of the present species is also slightly different; I am unable, having only one specimen to dissect, to examine this in section.

"The jaw is very thin and delicate, and so colourless that its detection and extraction are very difficult. It has a well defined central projection on the cutting edge.

"The generative organs (Plate XII. figs. 3, 3a) cannot be described so fully as one would wish, owing to the expanded state of the uterus. The hermaphrodite duct and albumen gland were perfect: and the male portion thence complete. The prostate—as it is called by Semper, shewn in his figure of *Microcystis myops* as a loose fringe-like set of convolutions—appears in this species as a closely packed and thickened mass of oblong form, flattened on one side, where the oviduct would be lying attached if perfect. The vas deferens is given off at the anterior end. The penis is a thickened muscular tube, broad and bulbous below, tapering upwards to where the very short thickened retractor muscle is given off: the vas deferens at this point has three sharp convolutions; seen with transmitted light a short, sharp, 'kink' occurs in the bulbous portion near the generative aperture.

"The sculpture of the shell, magnified about thirty times, presents a very fine, regular, slightly wavy, longitudinally striated surface; this striation is strongest near the suture, becoming finer outwards. There are about 11 striae to .003 inch. The most advanced embryonic shell consists of  $2\frac{1}{4}$  whorls, the sculpture is well shewn on it.

"The point now to be solved is whether we are to retain this species in *Microcystis*. Mr Sykes regards<sup>1</sup> *M. ornatella* as the type of the genus; this was also the opinion of H. Nevill. Further Mr Sykes goes on to say 'Now these small Zonitoids [*i.e.* those of the Hawaiian Islands] hardly fit into the same genus as this species and therefore some other generic title is required for them.' The anatomy now described, shews, for many reasons, that the shell cannot be placed in *Macrochlamys* as Mr Sykes, guided by the shell characters, proposed. In my opinion it is undoubtedly close to *Kaliella*, still closer to *Sitala*, and yet there are sufficient differences in the generative organs to separate this Hawaiian form from both. If we take the shell alone into account, the sculpture presents one character, viz. fine, close longitudinal striation, not found in the Indian species of *Sitala*, in which the general surface is smooth, with spiral liration.

<sup>1</sup> P. Malac. Soc. London, II. 1896, p. 131.

The sculpture of *Kaliella* is finer and transverse to the whorl, so differs still more. It therefore may become necessary, if this shell be generally distinct from *M. ornatella*, to create a new genus.

“When we consider the immense area on the Equatorial belt over which *Kaliella*, *Sitala*, and this allied form are distributed, it appears that they fall naturally into a subfamily of their own which may be called the SITALINAE, Godwin-Austen, *nom. nov.*; one that is sufficiently distinct from the Durgellinae on the one hand, with which they are associated over a large portion of their range, and from the Macrochlaminae on the other, where the area of association is more restricted and the differences in the animal much greater.” (H. H. Godwin-Austen.)

(3) *Philonesia cicercula* Gould.

*Helix cicercula* Gould, P. Boston Soc. II. (1846), p. 171; U.S. Explor. Exped. *Moll.* pl. v. fig. 73.

HAB. Hawaii (Gould); Kohala (Perkins).

var. *boettgeriana* Ancey.

*Microcystis cicercula* var. *boettgeriana* Ancey, Bull. Soc. Malac. France, VI. p. 206.

HAB. Hawaii, Kona (Ancey).

(4) *Philonesia exaequata* Gould.

*Helix exaequata* Gould, P. Boston Soc. II. (1846), p. 171; U.S. Explor. Exped. *Moll.* pl. v. fig. 61.

*Helix disculus* Pfeiffer, Zeitschr. für Malak. VII. 1851, p. 68 [*non* Deshayes].

*Helix obtusangula* Pfeiffer, *t. c.* p. 153.

*Nanina discus* Pfeiffer, Tryon, Man. Conch. Ser. II. Vol. II. p. 114.

HAB. Kauai (Gould, Perkins).

(5) *Philonesia hartmanni* Ancey.

*Microcystis hartmanni* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 198.

HAB. Oahu (Ancey); Kalaikoa (Baldwin).



(6) *Philonesia indefnita* Ancey.*Microcystis indefnita* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 203.

HAB. Maui, east part (Ancey); Makawao (Baldwin).

(7) *Philonesia lymanniana* Ancey.*Microcystis lymanniana* Ancey, Mem. Soc. Zool. France, VI. (1893), p. 329.

HAB. Oahu, Waialae (Ancey).

(8) *Philonesia oahuensis* Ancey.*Microcystis oahuensis* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 202.

HAB. Oahu (Ancey); Halemano (Perkins).

I refer, with some doubt, a single specimen found by Mr Perkins, to this unfigured species.

var. *depressiuscula* Ancey.*M. oahuensis* var. *depressiuscula* Ancey, *t. c.* p. 203.

HAB. Oahu (Ancey).

(9) *Philonesia perlucens* Ancey.*Microcystis perlucens* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 207.

HAB. Maui, east part (Ancey).

(10) *Philonesia perkinsi* Sykes.*Macrochlamys perkinsi* Sykes, P. Malac. Soc. London, II. (1896), p. 126.

Plate XI. figs. 41, 42.

HAB. Lanai.—(?) Oahu, a single specimen (Perkins).

(11) *Philonesia platyla* Ancey.

*Microcystis platyla* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 196; Sykes,  
P. Malac. Soc. London, III. pl. XIII. figs. 13—15.

HAB. Oahu (Ancey); Waianae Mts. (Baldwin, Perkins).

(12) *Philonesia plicosa* Ancey.

*Microcystis plicosa* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 200.

HAB. Oahu (Ancey); Palolo (Baldwin).

(13) *Philonesia sericans* Ancey.

*Microcystis sericans* Ancey, P. Malac. Soc. London, III. (1899), p. 268.

HAB. Hawaii, Olaa (Ancey).

(14) *Philonesia subrutila* Mighels.

*Helix subrutila* Mighels, P. Boston Soc. II. (1845), p. 19.

HAB. Oahu (Mighels, &c.).—Mr Baldwin gives Kauai, but I doubt this; the species is unknown to me.

(15) *Philonesia subtilissima* Gould.

*Helix subtilissima* Gould, P. Boston Soc. II. (1846), p. 177; U.S. Explor. Exped. Moll. pl. v. fig. 62.

Unknown to me; from the figure I am not certain of its generic position.

HAB. Maui (Gould).

(16) *Philonesia turgida* Ancey.

*Microcystis turgida* Ancey, Bull. Soc. Malac. France, VII. (1890), p. 339; Sykes, P. Malac. Soc. London, III. pl. XIII. figs. 5—7.

HAB. Maui (Ancey); Makawao (Baldwin); Mts. at 4000 ft. (Perkins).—A specimen found on Lanai by Mr Perkins, may belong to a variety.

Obs. The *Helix misella* of Férussac has been recorded with a query from the islands, but does not really belong to their fauna.

## KALIELLA Blanford.

Type the group of *Helix barrakporensis* Pfr.



(1) *Kaliella konaensis* Sykes.

*Kaliella konaensis* Sykes, P. Malac. Soc. London, II. p. 299.

Plate XI. fig. 33.

A remarkable little shell which seems to fall between *Kaliella* and *Trochoconulus*.

HAB. Hawaii, Mt. Kona, at 3000 ft. (Perkins).

## Fam. PHILOMYCIDAE.

## TEBENNOPHORUS Binney.

*Tebennophorus* Binn., J. Boston Soc. IV. 1844, p. 171 (Type *Limax carolinensis*, Bosc).

(1) *Tebennophorus bilineatus* Benson.

*Incilaria bilineata* Benson, Ann. Nat. Hist. IX. 1842, p. 486.

*Philomycus bilineatus* Benson, Martens, Preuss. Exped. Ost-Asien, Mollusca, p. 16, pl. v. fig. 1.

*Tebennophorus australis* Bergh?, Collinge, P. Malac. Soc. London, II. p. 50.

*Tebennophorus striatus* Hasselt, Collinge, *t. c.* p. 295.

HAB. Oahu, Mount Tantalus, Honolulu at 2000 ft.—Kauai, Lihue at 2000 ft.—Hawaii, Olaa at 2000 ft. (Perkins).

See Collinge, J. Malac. VII. 1900, p. 80.

(2) *Tebennophorus striatus* Hasselt.

*Meghimatium striatum* Hasselt, Bull. Sci. Nat. Geol. III. 1824, p. 82.

*Tebennophorus striatus* Hasselt, Collinge, P. Malac. Soc. London, II. p. 50.

HAB. Oahu, Mount Tantalus (Perkins).

## Fam. ENDODONTIDAE.

## ENDODONTA Albers.

*Endodonta* Alb., Die Heliceen, 1850, p. 89 (first species *Helix lamellosa*, Fér.);

*Op. cit.* Ed. 2, 1860, p. 90 ("typus *Helix lamellosa*, Fér.").

(1) *Endodonta apiculata* Ancey.

*Endodonta apiculata* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 189.

HAB. Kauai, Dr Newcomb (Ancey).

(2) *Endodonta lamellosa* Férussac.

*Helix lamellosa* Férussac, Hist. Moll. I. p. 369, pl. LI. A, fig. 3; Quoy and Gaimard, Voy. Freycinet, Zool. p. 469, Pfeiffer, Conchylien-Cabinet, *Helix*, p. 197, pl. c. figs. 6—8.

*Helix fricki* Pfeiffer, P. Zool. Soc. London, 1858, p. 21, pl. XL. fig. 3.

According to Mörch (J. Conchyl. XIII. p. 395) this species “dépose ses œufs dans l'ombilic.”

The teeth or lamellæ seem to be variable; some specimens shew traces of a second tooth in the upper portion of the outer lip, thus having nine teeth in all. Considerable variation is also shewn in the relative proportions of height and breadth, and in the width of the umbilicus.

HAB. Oahu (Pease, Ancey); Waianae Mts. and Konahuanui (Baldwin); Mt. Kaala.—Lanai Mts. behind Koele (Perkins).

(3) *Endodonta laminata* Pease.

*Helix laminata* Pease, Amer. J. Conch. II. (1866), p. 292.

According to the diagnosis this differs from the last by being spirally sculptured as well as transversely ribbed, thereby becoming decussated. The teeth appear to be identical in number and position and I believe it will, eventually, only prove to be a local race.

Tryon (Man. Conch. Ser. 2, III. p. 70) considered it to be a form of *E. cavernula*, Hombr. and Jacq., stating “I have before me two trays of shells named *Helix laminata* Pease, from the ‘Sandwich Is.,’ one of them from the describer, which undoubtedly represent the same species.” Since the two forms differ, from the diagnoses, so widely in the armature, there must, I think, be some error.

HAB. Kauai (Pease); Kahiliwi to Haena (Baldwin).



## Sub-genus THAUMATODON Pilsbry.

(4) *Endodonta (Thaumatodon) contorta* Férussac.*Helix contorta* Férussac, Hist. Moll. I. p. 10, pl. LI. A, fig. 2.*Helix intercarinata* Mighels, P. Boston Soc. II. (1845), p. 18.

Specimens found by Mr Perkins, and which I refer to this species, appear to shew considerable variation and may be divided as follows :

A. Six specimens, fairly typical in shape and size, but only one is furnished with five palatal teeth, the others having four.

B. One specimen, darker in colouration, the colour markings being very distinct, palatal teeth five, these being remarkably incrassated.

C. A long series (from Makaweli), larger, slightly more strongly sculptured and very variable in colouration, sometimes the dark brown colour predominating, at others a greenish yellow. All appear to have four palatal teeth only.

HAB. Oahu (various authors).—Kauai (Perkins).

(5) *Endodonta (Thaumatodon) hystricella* Pfeiffer.*Helix hystricella* Pfeiffer, P. Zool. Soc. London, 1859, p. 25.

The original examples of this unfigured species, referred to as in Mus. Cuming, do not appear to be now in the British Museum. Two specimens found by Mr Perkins agree well with Pfeiffer's diagnosis and dimensions ; they also accord in the number of teeth.

HAB. Kauai (Pease).—Oahu, Kaala (Perkins).

(6) *Endodonta (Thaumatodon) nuda* Ancey.*Endodonta (Thaumatodon) nuda* Ancey, P. Malac. Soc. London, III. (1899), p. 268, pl. XII. fig. 1.

HAB. Hawaii, Olaa (Ancey).

(7) *Endodonta (Thaumatodon) ringens* Sykes.*Endodonta (Thaumatodon) ringens* Sykes, P. Malac. Soc. II. (1896), p. 126.

Plate XI. figs. 39, 40.

In describing this species, I referred to it as having four teeth within the outer lip ; perhaps it would be more correct to say "one basal tooth and three within the

outer lip." The ribs appear to be at varying distances apart. The Molokai specimens appear to belong to a large variety.

HAB. Lanai Mountains, behind Koele.—Molokai in wet forest above Pelekunu (Perkins).

(8) *Endodonta (Thaumatodon) rugata* Pease.

*Helix rugata* Pease, Amer. J. Conch. II. (1866), p. 291.

HAB. Maui (Pease).

Sub-genus NESOPHILA Pilsbry.

The following table may assist in separating the species of *Nesophila*.

A. Parietal lamellæ absent.—*E. capillata* Pease.

B. Parietal lamella single.—*E. decussatula* Pease; *E. elisae* Ancey; *E. jugosa* Mighels; *E. lanaiensis* Sykes; *E. stellula* Gould.

C. Parietal lamellæ two.—*E. binaria* Pfeiffer; *E. hystrix* (Mighels MS.) Pfeiffer; *E. paucicostata* Pease.

D. Parietal lamellæ several.—*E. baldwini* Ancey; *E. distans* Pease; *E. tiara* Mighels.

(9) *Endodonta (Nesophila) baldwini* Ancey.

*Charopa baldwini* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 176.

Mons. Ancey also records a white variety.

HAB. Hawaiian Islands (Ancey).

(10) *Endodonta (Nesophila) binaria* Pfeiffer.

*Helix binaria* Pfeiffer, P. Zool. Soc. London, 1856, p. 33.

I am unable to trace the type of this species, which should have passed with Cuming's collection into the British Museum.

HAB. Kauai (Pease).

(11) *Endodonta (Nesophila) capillata* Pease.

*Helix capillata* Pease, Amer. J. Conch. II. (1866), p. 292.

HAB. Kauai (Pease).



(12) *Endodonta (Nesophila) decussatula* Pease.*Helix decussatula* Pease, Amer. J. Conch. II. (1866), p. 291.

HAB. Molokai (Pease); Mountains at 4000 ft. (Perkins).

Mr Baldwin gives "Kauai" as the habitat, but, since he marks it as a species he has not seen, I think there is probably some error.

(13) *Endodonta (Nesophila) distans* Pease.*Helix distans* Pease, Amer. J. Conch. II. (1866), p. 290.

HAB. Kauai (Pease).

(14) *Endodonta (Nesophila) elisae* Ancey.*Pitys elisae* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 180.

Unknown to me.

HAB. ? Hawaiian Islands (Ancey).

(15) *Endodonta (Nesophila) hystrix* (Mighels MS.) Pfeiffer.*Helix hystrix* Pfeiffer, Symb. Hist. Hel. III. p. 67; Gould, U. S. Explor. Exped. Moll. pl. IV. fig. 52\*.*Helix setigera* Gould, P. Boston Soc. I. p. 174 [nec Sowerby].It is, of course, not the *Helix hystrix* of Cox, an Australian species.

HAB. Oahu (authors); Mount Kaala, Oahu (Perkins).

(16) *Endodonta (Nesophila) jugosa* Mighels.*Helix jugosa* Mighels, P. Boston Soc. II. (1845), p. 19.*Helix rubiginosa* Gould, P. Boston Soc. II. (1846), p. 173; U. S. Explor. Exped. Moll. pl. IV. p. 49.

The two forms were first united by Pease<sup>1</sup>, who stated that the synonymy was accepted by Gould; recently Mons. Ancey<sup>2</sup> has revived *E. rubiginosa* as a species, referring to it some shells from Oahu. In this state of conflict I have followed Pease, considering that he and Gould were in the best position to form an opinion.

HAB. Kauai, Waioli to Kapaa (Baldwin); Kauai (Perkins, etc.).

<sup>1</sup> J. Conchyl. XIX. (1870), p. 95.<sup>2</sup> Bull. Soc. Malac. France, VI. (1889), p. 179.

(17) *Endodonta (Nesophila) lanaiensis* Sykes.

*Endodonta (Nesophila) lanaiensis* Sykes, P. Malac. Soc. London, II. (1896), p. 127.

Plate XI. figs. 37, 38.

Specimens from Kauai which I refer to this species are strongly hispid in the young state, but with age the hairs appear to be rubbed off; none of those from Lanai are very young, and only traces of hairs can be seen. The species appears to be near *E. decussatula*, but it almost lacks decussation and is darker in colour; the interstices of the ribs are closely, finely, striate. Save for the presence of a parietal lamella, the Kauai specimens approach Pease's diagnosis of *E. capillata*.

HAB. Lanai Mountains, behind Koele.—Kauai, Makaweli, on *Dracaena* and *Cheirodendron* (Perkins).

(18) *Endodonta (Nesophila) paucicostata* Pease.

*Helix paucicostata* Pease, J. Conchyl. XVIII. (1870), p. 395.

*Helix filocostata* Pease, P. Zool. Soc. London, 1871, p. 454.

HAB. Kauai (Pease).

(19) *Endodonta (Nesophila) stellula* Gould.

*Helix stellula* Gould, P. Boston Soc. I. (1844), p. 174; U. S. Explor. Exped. Moll. pl. IV. fig. 52†.

HAB. Maui (Gould).

(20) *Endodonta (Nesophila) tiara* Mighels.

*Helix tiara* Mighels, P. Boston Soc. II. (1845), p. 19; Kuster, Conch.-Cab. *Helix*, pl. CXXV. figs. 9—11.

According to Mons. Ancey<sup>1</sup> this species possesses several parietal lamellæ; if so, the character has been omitted from the various diagnoses.

HAB. Kauai (various authors).

(21) *Endodonta (Nesophila)*, sp.

Two interesting little specimens with a depressed spire were found on Molokai by Mr Perkins, the exact habitat being "Forest above Pelekunu"; they have 4—4½ whorls, with two parietal lamellæ and no teeth within the other lip, but appear not to be adult.

HAB. Molokai.

<sup>1</sup> Bull. Soc. Malac. France, VI. p. 175.



## PTERODISCUS Pilsbry.

Type, *P. wesleyi* Sykes.

(1) *Pterodiscus digonophorus* Ancey.

*Patula digonophora* Ancey, Bull. Soc. Malac. France, vi. (1889), p. 171; Sykes, P. Malac. Soc. London, III. pl. XIII. figs. 9—11.

HAB. Oahu (Ancey); Waianae Mts. (Baldwin).

(2) *Pterodiscus petasus* Ancey.

*Pterodiscus petasus* Ancey, P. Malac. Soc. London, III. (1899), p. 268, pl. XII. fig. 4.

HAB. Oahu, Waianae Mts. (Ancey).

(3) *Pterodiscus wesleyi* Sykes.

*Endodonta (Pterodiscus) wesleyi* Sykes, P. Malac. Soc. London, III. (1896), p. 127.

*Endodonta (Pterodiscus) alata* Pfeiffer, Pilsbry, Man. Conch. (2) IX. p. 36, pl. IV. fig. 44 [nec *Helix alata*, Pfeiffer].

HAB. Hawaiian Islands.

The following two species, placed in this group by Mr Pilsbry<sup>1</sup>, with the habitat of Hawaiian Islands, are unknown to me. They were originally described from "Islands of the Central Pacific" by Pease: the first has been recorded from Tahiti, but never again found there, and Mons. Ancey has suggested a Hawaiian origin; the second has been localized as from (?) Lanai. They are *Helix prostrata* and *H. depressiformis* (P. Zool. Soc. London, 1864, p. 670).

## Fam. HELICIDAE.

## PAPUINA von Martens.

*Papuina* Mart., Die Heliceen, Ed. 2, 1860, p. 166 (type *Helix lituus*, Lesson).

(1) *Papuina barnaclei* Smith.

*Helix (Merope?) barnaclei* Smith, Ann. Nat. Hist. (4) XX. p. 242.

I am informed that careful search has been made, in the neighbourhood indicated, but that no trace of the species can be found. At present, bearing in mind on the one

<sup>1</sup> Man. Conch. (2) IX. p. 36.

hand the improbability of a species of *Papuina* occurring in Hawaii, and on the other the positive statement of the original collector, I can but include it, with this note of warning.

HAB. Hawaii, eight miles from Kailua (Smith).

#### EULOTA Hartmann.

*Eulota* Hart., Erd- und Susswasser Gasteropoden, p. 179 (type *Helix fruticum*, Müll.). The date usually given is 1842, but the title-page of the copy in the British Museum bears that of 1840.

#### (1) *Eulota similaris* Férussac.

*Helix similaris* Férussac, Prodrôme, 1822, p. 47 (*nom. sol.*); Hist. Moll. 1. p. 171, pl. xxv. B, figs. 1—4, xxvii. A, figs. 1—5.

A widely scattered species; presumably not indigenous.

HAB. Kauai (Pilsbry).—Oahu, Tantalus (Perkins).

The following have been described under the term *Helix* and recorded from the Islands.

*Helix fornicata* Gould, P. Boston Soc. II. (1846), p. 172.

Supposed to come from Kauai. Tryon notes<sup>1</sup>: "In the corrigenda to the Mollusca of the Wilkes Exploring Expedition, Dr Gould states that the only specimen was lost, and *H. tongana* Quoy, figured by the artist for this species."

*Helix sandwichensis* Pfeiffer, P. Zool. Soc. London, 1849, p. 128.

Appears to be the young of a South American *Systrophia*.

*Helix exserta* Pfeiffer, P. Zool. Soc. London, 1856, p. 32.

Only a fragment of the type remains; it has never been figured.

#### Fam. PUPIDAE.

#### PUPA Draparnaud (1801).

*Pupa* Drap., Tabl. Moll. France, pp. 32, 56 (first species *Turbo muscorum* L.); 1805, Hist. Moll. France, p. 59.

There appears to be a *Pupa* of Lamarck of even date (Syst. anim. sans Vert. p. 88) with *Turbo uva* as type; also, through the kindness of Mr Sherborn, I have

<sup>1</sup> Man. Conch. (2), III. p. 27.



examined the *Museum Boltenianum*, Ed. 1. 1798, and Bolten proposed *Pupa* (p. 110) for *Voluta flammica* and *V. solidula*. The first species belongs to *Actaeon* (1810) and the second is the type of *Solidula* (1807). If, therefore, Bolten's names are to be used, *Pupa* Drap. cannot stand unless it prove to be the same as *Pupa* Humphrey, 1797 (*Mus. Calonnianum*).

An excellent study of the Pupidae of Oceania has been written by Dr Boettger; the attention of subsequent authors does not appear to have been sufficiently directed to this paper.

(1) *Pupa acanthinula* Ancey.

*Pupa acanthinula* Ancey, Mem. Soc. Zool. France, v. (1892), p. 709.

HAB. Oahu, Makiki (Ancey).

(2) *Pupa admodesta* Mighels.

*Pupa admodesta* Mighels, P. Boston Soc. II. (1845), p. 19; Boettger, Conch. Mittheil. I. p. 58, pl. XII. fig. 15.

HAB. Oahu (Mighels).

(3) *Pupa bacca* Pease.

*Pupa bacca* Pease, P. Zool. Soc. London, 1871, p. 462.

HAB. Hawaii, Kalapana (Pease).

(4) *Pupa costata* Pease.

*Pupa costata* Pease, P. Zool. Soc. London, 1871, p. 462.

HAB. Hawaii (Pease).

(5) *Pupa lyonsiana* Ancey.

*Pupa lyonsiana* Ancey, Mem. Soc. Zool. France, v. (1892), p. 713.

HAB. Oahu, Punahou (Ancey).

(6) *Pupa lyrata* Gould.

*Pupa lyrata* Gould, P. Boston Soc. I. (1843), p. 139; Boettger, Conch. Mittheil. I. p. 61, pl. XII. fig. 17.

*Pupa striatula* Pease, P. Zool. Soc. London, 1871, p. 461.

*Pupa magdalenae* Ancey, Mem. Soc. Zool. France, v. (1892), p. 716.

I follow Dr Boettger in placing *P. striatula* with *P. lyrata*, and have added *P. magdalenae*, since the character of two parietal teeth, on which Mons. Ancey lays special stress, is found in some undoubted specimens of *P. lyrata*.

HAB. Hawaii (Pease).—Oahu (Baldwin); Palaina (Ancey).

(7) *Pupa mirabilis* Ancey.

*Pupa mirabilis* Ancey, Bull. Soc. Malac. France, VII. (1890), p. 339.

HAB. Oahu (Ancey).

(8) *Pupa newcombi* Pfeiffer.

*Pupa newcombi* Pfeiffer, P. Zool. Soc. London, 1852 [1854], p. 69; Kuster, Conch.-Cab. *Pupa*, pl. XX. figs. 23, 24.

*Pupa costulosa* Pease, P. Zool. Soc. London, 1871, p. 462.

HAB. Hawaii (Pease, Baldwin).—Oahu and Kauai (Baldwin) [sed quaere, E.R.S.].

var. *seminulum* Boettger.

*Pupa newcombi* var. *seminulum* Boettger, Conch. Mittheil. I. p. 58, pl. XII. fig. 14.

HAB. Probably Hawaii (Boettger).

(9) *Pupa pediculus* Shuttl. var. *nacca* Gould.

*Vertigo nacca* Gould, P. Boston Soc. VIII. (1862), p. 280.

Dr Boettger has pointed out that this is only a form of *P. pediculus*, Shuttleworth (Bern. Mittheil. 1852, p. 296), and barely of varietal rank. The typical form appears not to be found in the Hawaiian Islands.

HAB. Hawaii (Gould).

(10) *Pupa perlonga* Pease.

*Pupa perlonga* Pease, P. Zool. Soc. London, 1871, p. 462; Boettger, Conch. Mittheil. I. p. 60, pl. XII. fig. 16.

Only two specimens, which I refer here with some hesitation, since the teeth are rather obscure.

HAB. Oahu (Pease).—Kauai, Makaweli (Perkins).



## Fam. ACHATINELLIDAE.

The various species of this family form probably one of the most puzzling groups of land-shells known: numerous 'species' have been described, founded almost entirely on shell colouration or banding, and this, bearing in mind such protean forms as *Tachea nemoralis* or *Polymita picta*, is a course which often leads to endless trouble. At present, such genera as *Achatinella* s. s. and *Achatinellastrum* are in utter confusion, and any attempt at a list of species simply reflects the general view of the writer and cannot be regarded as authoritative.

Of recent years some species have been described, based on shell-colouration combined with that of the mantle, but it should be remembered that some malacological characteristics are frequently as liable to variation as are conchological ones. The severance of species by consideration of habitat is, again, not a necessarily certain guide, since one species of mollusc may range widely, while at different points of its range, local variations may occur.

The history of the Achatinellidae in literature commences with Dixon's description of *Turbo apexfulva*; subsequently stray species were described by various authors, but no serious attempts were made at their study until about 1850-60, when Newcomb and Pfeiffer added greatly to our knowledge. To Mr Gulick, in 1858, we owe large additions to the catalogue—so far as names go—but his views of species were somewhat too narrow, and he described many trifling variations as species, mainly on the ground of geographical range. Later, Pease did useful work and gave a catalogue of the family. Dr Hartman, in 1888, listed the known forms in a similar way. Of recent years Mr Baldwin has done the chief work on the group, and his very valuable catalogue has been of great assistance.

Numerous genera and sections have been described, almost all on purely conchological grounds, and so variable are the forms that linking species are easily found. Still they prove useful in the arrangement of species and therefore have been admitted in this work.

A list of them arranged in chronological order may be of use.

- 1828. *Achatinella* Swainson, Q. J. Sci. Lit. and Arts, p. 81.
- 1847. *Leptachatina* Gould, P. Boston Soc. II. p. 201.
- 1854. *Partulina* Pfeiffer, Malak. Blatt. I. p. 114.
- 1854. *Newcombia* Pfeiffer, t. c. p. 117.
- 1854. *Bulimella* Pfeiffer, t. c. p. 119.
- 1854. *Laminella* Pfeiffer, t. c. p. 126.
- 1854. *Achatinellastrum* Pfeiffer, t. c. p. 133.
- 1854. *Labiella* Pfeiffer, t. c. p. 142.

1855. *Carelia* H. & A. Adams, Gen. Rec. Moll. II. p. 132.  
 1855. *Amastra* H. & A. Adams, *t. c.* p. 137.  
 1855. *Auriculella* Pfeiffer, Malak. Blatt. II. p. 3.  
 1855. *Frickella* Pfeiffer, *t. c.* p. 3.  
 1860. *Apex* Martens, Die Heliceen, p. 248.  
 1870. *Eburnella* Pease, P. Zool. Soc. London, 1869, p. 647.  
 1870. *Perdicella* Pease, *t. c.* p. 649.  
 1875. *Carinella* Pfeiffer, Novit. Conch. IV. p. 116.  
 1899. *Thaanumia* Ancey, P. Malac. Soc. London, III. p. 269.  
 1899. *Baldwinia* Ancey, *t. c.* p. 270.

Mr Pilsbry's remark, that the use of Férussac's term *Helicteres* "would open the door to an endless series of vagaries in nomenclature," appears to me to be thoroughly justified; for the converse view see Pease, P. Zool. Soc. London, 1862, p. 3. The *Achatinella* of Schlüter (1838) appears to be a mixture of *Ferussacia* and allied groups.

Our knowledge of the anatomy is due primarily to Bland and Binney, who pointed out that the Achatinellidae may be divided into two main groups based on the characters of the radula and jaw; also that *Carelia*, while it agrees in the radula with the *Leptachatina* and *Amastra* group, differs in the characters of the jaw. Heynemann has also written on the subject, and recently notes have been published by Messrs Gwatkin, Pilsbry and Suter. Mr Pilsbry has recently<sup>1</sup> stated with reference to *Partula* and *Achatinella* that "these forms have no relations with the Bulimulidae and Achatinidae, with which conchologists associate them, but lie at the base of the terrestrial pulmonate tree."

The classification here adopted is:

Genus *Achatinella*. Subgenn. *Achatinella* s. s. (Syn. *Apex*.) *Bulimella*. *Partulina*. (Syn. *Baldwinia*.) *Achatinellastrum*. (Syn. *Eburnella*.)

Genus *Perdicella*.

Genus *Newcombia*.

Genus *Amastra*. Subgenn. *Amastra* s. s. *Laminella*. *Amastrella*, n. subgen. *Kanaia*, n. n. [*Carinella*, Pfr., nec Sby.]

Genus *Leptachatina*.

Genus *Thaanumia*.

Genus *Carelia*.

Genus *Auriculella*.

Genus *Frickella*.

<sup>1</sup> Ann. nat. Hist. IV. (1899), p. 156.



## ACHATINELLA s. str.

Synonym. *Apex* von Martens.

Well has Dr Hartman remarked, that the species of this group "are involved in almost inextricable confusion." Our ignorance of the animal in most forms, combined with the fact that authors have described frequently from single specimens, or from series of two or three, entirely at present prevents one ascertaining the true specific limits.

In the one or two instances where I have attempted 'lumping,' the results are due to a long series of specimens in which I have been unable to arrive at a definite break between the one 'species' and the other.

The conclusions I have drawn are founded on Newcomb's and Pfeiffer's type specimens; specimens compared with Gulick's types; further a few of the types described by Mr Smith; and, finally, the specimens collected by Mr Perkins and a collection formed by Mr Hutchison.

All the species of this group are confined to the Island of Oahu.

(1) *Achatinella albospira* Smith.

*Apex albospira* Smith, P. Zool. Soc. London, 1873, p. 77, pl. x. fig. 8.

Unknown to me; it has been united by Dr Hartman with *A. turgida* Newc. [= *A. cestus* Newc.].

HAB. Oahu, Ewa.

(2) *Achatinella apexfulva* Dixon.

*Turbo apex fulva* Dixon, Voyage round the world, 1789, p. 344, figd. on an unnumbered plate.

*Turbo lugubris* Chemnitz, Conch.-Cab. XI. 1795, p. 278, pl. CCIX. figs. 2059, 2060.

*Cochlogena (Helicteres) lugubris* Chemnitz, Férussac, Prodrome, p. 60, no. 431.

*Monodonta seminigra* Lamarck, Hist. Nat. Anim. sans Vert. VII. (1822), p. 37.

*Achatinella pica* Swainson, Zool. Ill. Moll. ser. II. pl. XCIX. fig. 1.

HAB. Oahu, Kawaihoa (Baldwin).

Dixon was thoroughly binomial, as a reference to his work will show: his figures are good, and the only point that can be made against the utilization of his name is that it appeared in three words. This, probably, was a printer's error, or a slip, as other names in the same work are proper, and suitable descriptions are given.

(3) *Achatinella apicata* (Newcomb MS.) Pfeiffer.

*Achatinella apicata* Pfeiffer, P. Zool. Soc. London, 1855 [1856], p. 210.

HAB. Oahu, Halemano (Perkins).

var. *polymorpha*, Gulick.

*Apex polymorpha* Gulick, P. Zool. Soc. London, 1873, p. 81, pl. x. fig. 5.

HAB. Oahu, Wahiawa, Kalaikoa, Ahonui (Gulick); Kawailoa Gulch, and above Ewa (Perkins).

var. *vespertina* Baldwin.

*Achatinella* (*Apex*) *vespertina* Baldwin, P. Ac. Philad. 1895, p. 219 [shell and animal], pl. x. fig. 14.

HAB. Oahu, Kawailoa (Baldwin); from a ridge between Waala and Kawailoa Gulches (Perkins).

var. *alba*, var. *n.*

Shell snow-white, save for the peristome being margined with lilac, similar tinting appearing on the columella plait, and inside the outer lip at its junction with the body-whorl of the shell.

HAB. Oahu, near head of Kawailoa Gulch (Perkins).

A fine series of this species. It appears to be distinct from *A. swiftii* Newc. [= *A. cestus* Newc. var.], to which Newcomb subsequently referred it, and the type of which I have examined. The shell is larger, different in form, and more polished, the ground colouring darker, and the banding not so conspicuous in the typical form: the protoconch is in general brown, and but rarely white. The prevailing tint is brown, sometimes becoming black with a white area below the suture, rarely altogether snow-white. A few, from near Kawailoa, are tinted with lilac on an ashy ground, occasionally having a chestnut sutural line; these form a passage to *A. vespertina* Baldwin, in which the lilac tint has changed to cream-colour. This latter is the only form in which the animal appears to have been noticed.

(4) *Achatinella bicolor* (Gulick) Pfeiffer.

*Achatinella bicolor* Pfeiffer, Mon. Hel. Viv. iv. 1859, p. 529.

Near, apparently, to *A. cookei* Baldwin.

HAB. Oahu, Lehui (Pfeiffer).

(5) *Achatinella cestus* Newcomb.

*Achatinella cestus* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 132, pl. xxii. fig. 8.

*Achatinella turgida* Newcomb, *tom. cit.* p. 134, pl. xxii. figs. 10, 10 a.

HAB. Oahu, Palolo and Ewa (Newcomb); Ewa and Halemano (Perkins).

var. *swiftii* Newcomb.

*Achatinella swiftii* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 133, pl. xxii. fig. 9; Ann. Lyc. New York, vi. p. 325 [animal].

*Achatinella* (*Achatinellastrum*) *valida* Pfeiffer, P. Zool. Soc. London, 1855, p. 6, pl. xxx. fig. 24.

*Apex flavidus* Gulick, *op. cit.* 1873, p. 80, pl. x. fig. 1.

*Apex tuberosus* Gulick, *tom. cit.* p. 81, pl. x. fig. 3.

*Apex liliaceus* Gulick, *tom. cit.* p. 79, pl. x. fig. 4.

*Apex turbiniformis* Gulick, *tom. cit.* p. 81, pl. x. fig. 7.

HAB. Oahu, Ewa (Newcomb); as *A. flavidus*, Kalaikoa and Ahonui (Gulick); as *A. tuberosus*, Kalaikoa, Ahonui, Wahiawa and Halemano (Gulick); as *A. turbiniformis*, Kalaikoa and Lehui (Gulick).

var. *forbesiana* Pfeiffer.

*Bulinella forbesiana* Pfeiffer, P. Zool. Soc. London, 1855, p. 5, pl. xxx. fig. 16.

*Apex gulickii* Smith, *loc. cit.* 1873, p. 78, pl. ix. fig. 19 [*non* 17].

HAB. Oahu as *A. gulickii*, Kalaikoa, Ahonui and Waialei (Smith).

The type form has the bands interrupted; in the variety *swiftii* they are continuous and almost confluent, recalling a dwarf *A. lugubris*. From the variety *swiftii*, given a fair number of specimens, we may pass by slight variations up to a nearly white shell with hardly a trace of banding. One specimen is light yellow and almost unmarked except the latter half of the last whorl, which is strongly banded with dark brown (Plate XI. figs. 6, 7). The general brown colouring is more persistent in the variety than in the typical form. The variety *forbesiana* is somewhat more elongate and slightly differently banded and coloured.

(6) *Achatinella cookei* Baldwin.

*Achatinella* (*Apex*) *cookei* Baldwin, P. Ac. Philad. 1895, p. 220, pl. x. fig. 15 [shell and animal]; Suter, *t. c.* p. 239 [radula].

HAB. Oahu, Waiau (Baldwin).



(7) *Achatinella decora* Férussac.

*Cochlogena (Helicteres) decora* Férussac, Prodrôme, 1822, p. 60, no. 430.

*Turbo lugubris sinistrorsus* Chemnitz, Conch.-Cab. XI. 1795, p. 307, pl. CCXIII.  
figs. 3014, 3015.

*Achatinella perversa* Swainson, Quart. Journ. Sci. &c. I. 1828, p. 84; Zool. Ill.  
1833, ser. II. pl. xcix. fig. 2; Newcomb, Ann. Lyc. New York, VI. 1858,  
p. 309 [animal].

*Achatinella concidens* Gulick, Ann. Lyc. New York VI. 1858, p. 234, pl. VIII.  
fig. 54.

HAB. Oahu, Halemano, Waimea.

var. *leucophaea* Gulick.

*Apex leucophaeus* Gulick, P. Zool. Soc. London, 1873, p. 82, pl. IX. fig. 16.

HAB. Oahu, Waialei.

var. *neglecta* Smith.

*Apex neglectus* Smith, P. Zool. Soc. London, 1873, p. 78, pl. IX. fig. 22.

*Apex coniformis* Gulick, *tom. cit.* p. 81, pl. IX. fig. 17.

HAB. Oahu, Wahiawa, Kalaikoa, Ahonui, Halemano (Smith, Gulick).

var. *versicolor* Gulick.

*Apex versicolor* Gulick, P. Zool. Soc. London, 1873, p. 80, pl. IX. fig. 18.

HAB. Oahu, Ahonui, Kalaikoa.

var. *innotabilis* Smith.

*Apex innotabilis* Smith, P. Zool. Soc. London, 1873, p. 78, pl. IX. fig. 23.

HAB. Oahu.

subspecies *mustelina* Mighels.

*Achatinella mustelina* Mighels, P. Boston Soc. II. 1845, p. 21; Reeve, Conch. Icon.

*Achatinella*, pl. III. fig. 21; Newcomb, Ann. Lyc. New York, VI. p. 313  
[animal].

HAB. Oahu, Waianae, Kaala.

var. *leucorraphe* Gulick.

*Apex leucorraphe* Gulick, P. Zool. Soc. London, 1873, p. 79, pl. x. fig. 2.

HAB. Oahu, Kalaikoa.

var. *cinerosa* Pfeiffer.

*Achatinella* (*Bulimella*) *cinerosa* Pfeiffer, P. Zool. Soc. London, 1855, p. 2, pl. xxx. fig. 5.

HAB. Oahu.

It is with much diffidence that the above 'lumping' has been attempted. While not very difficult as a general rule to identify single specimens, I have been unable to divide the long series of specimens which, partly collected by Mr Perkins and partly by Mr Hutchison, have passed through my hands. Shape, colour, and form, seem to be as nothing, and one passes by infinitesimal graduations from one so-called species to another. True it is that the animals are said to differ in colour, but this alone is not, in my opinion, sufficient for a specific character; even if it be so, it can, in general, only avail the field naturalist, and not the Museum student.

The variety *neglecta* Smith is not really so greenish as represented in the original figure; fig. 23 on the same plate gives a better idea of the real colour.

Férussac appears to have confounded more than one distinct form under his *decora*; the name has therefore been here used for the species he first referred to.

(8) *Achatinella dolium* Pfeiffer.

*Achatinella* (*Bulimella*) *dolium* Pfeiffer, P. Zool. Soc. London, 1855, p. 5, pl. xxx. fig. 15.

HAB. Molokai (Baldwin).

I fancy this habitat must be wrong and that the species really belongs to Oahu; the shell is very close to *A. hanleyana* Pf., and may prove to be only a colour variety.

(9) *Achatinella hanleyana* Pfeiffer.

*Achatinella* (*Bulimella*) *hanleyana* Pfeiffer, P. Zool. Soc. London, 1855, p. 202.

Related to the form of *A. lorata* described as *A. nobilis*, and may prove to be an extreme variety.

HAB. Oahu.

(10) *Achatinella lorata* Férussac.

*Helix* (*Cochlogena*) *lorata* Férussac, Prodrôme, 1822, p. 60.

*Achatina lorata* Férussac, Deshayes, Hist. Moll. II. p. 193, pl. CLV. figs. 9—11.

*Achatinella lorata* Férussac, Newcomb, Ann. Lyc. New York, IV. p. 310 [animal];

Semper, Reis. im Philippinen, Landmollusken, pl. XVI. fig. 23 [anatomy].

*Achatinella alba* Nuttall, Jay, Cat. Shells, Ed. III. 1839, p. 58 [*nomen solum*].

*Achatinella pallida* Nuttall, Jay, *loc. cit.*; Reeve, Conch. Icon. *Achatinella*, sp. 2.

*Achatinella* (*Bulinella*) *nobilis* Pfeiffer, P. Zool. Soc. London, 1855, p. 202.

*Achatinella ventrosa* Pfeiffer, *op. cit.* 1855, p. 6, pl. XXX. fig. 20.

Non *A. lorata* Férussac, Reeve, Conch. Icon. *Achatinella*, sp. 6.

A very variable shell, with or without colour bands, and, occasionally, pure white.

HAB. Oahu (various authors); Manoa to Halawa (Baldwin); Nuuanu, Head of Panoa Valley, Mount Tantalus (Perkins).

(11) *Achatinella multilineata* Newcomb.

*Achatinella multilineata* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 138, pl. XXII. fig. 23.

*Achatinella* (*Bulinella*) *monacha* Pfeiffer, *op. cit.* 1855, p. 3, pl. XXX. fig. 9.

HAB. Oahu, Waianae Mountains (Baldwin); Koolau poko (Newcomb). Dr Hartman referred this species, apparently by error, to Maui.

(12) *Achatinella naps* Pfeiffer.

*Achatinella* (*Achatinellastrum*) *naps* Pfeiffer, P. Zool. Soc. London, 1855, p. 5, pl. XXX. fig. 19.

*Achatinella* (*Bulinella*) *concavospira* Pfeiffer, *op. cit.* 1859, p. 30.

*Apex leucozonus* Gulick, *op. cit.* 1873, p. 83, pl. X. fig. 6.

HAB. Oahu.

I regret to be unable to agree with Newcomb that *A. naps* is the same as *A. pulcherrima* Swainson. *A. concavospira* seems to be only an elongate variety; the types of both species are in the British Museum (Natural History).

(13) *Achatinella ovum* Pfeiffer.

*Achatinella* (*Achatinellastrum*) *ovum* Pfeiffer, P. Zool. Soc. London, 1856, p. 334.

HAB. Oahu.



(14) *Achatinella pulchella* Pfeiffer.

*Achatinella* (*Achatinellastrum*) *pulchella* Pfeiffer, P. Zool. Soc. London, 1855, p. 6, pl. xxx. fig. 2.

A small species, very variable in colour, with a blunt apex, and somewhat depressed in form.

HAB. Oahu, mountains behind Ewa (Perkins).

(15) *Achatinella sordida* Newcomb.

*Achatinella sordida* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 139, pl. xxiii. fig. 27.

Some specimens run very close to *A. decora* Fér.

HAB. Oahu, Lihue (Newcomb).

(16) *Achatinella swainsoni* Pfeiffer.

*Achatinella* (*Bulinella*) *swainsoni* Pfeiffer, P. Zool. Soc. London, 1855, p. 4, pl. xxx. fig. 13.

Newcomb suggested that this might be only a form of *A. sordida*; it appears, however, to be distinct, being broader, brown in general coloration, and having a brown, in place of a white lip. It is a little doubtful, from its form, if it be correctly placed in this group, but the sections are very artificial.

HAB. Oahu.

(17) *Achatinella vittata* Reeve.

*Achatinella vittata* Reeve, Conch. Icon. *Achatinella*, 1850, sp. 9.

*Achatinella simulans* Reeve, *loc. cit.* sp. 15.

*Achatinella* (*Achatinellastrum*) *globosa* Pfeiffer, P. Zool. Soc. London, 1855, p. 7, pl. xxx. fig. 25.

*Apex albofasciatus* Smith, *op. cit.* 1873, p. 78, pl. ix. fig. 21.

*Apex tumefactus* Gulick, *tom. cit.* p. 82, pl. ix. fig. 20.

*Helix decora* Férussac, Quoy and Gaimard, Voy. Uranie et Phys. 1824, Zool. p. 478 [nec *H. decora* Fér. 1822 = *A. perversa* Swainson].

*Achatina decora* Férussac, Deshayes, Hist. Moll. ii. pt. 2, p. 191, pl. clv. figs. 5, 7.

*Achatinella decora* Férussac, Newcomb, Ann. Lyc. New York, vi. p. 307 [animal].

? ? *Achatinella vestita* Mighels, P. Boston Soc. ii. 1845, p. 20.

HAB. Oahu, Waheawa, Halemano, Nuuanu Valley, &c.

var. *cinerea*, n. var.

Banding almost black on the last whorl, ash coloured on the whorl above, the upper whorls tinted with pale brown banding above the suture, replaced by an almost black line at the apex.

HAB. Oahu, Nuuanu (Perkins).

Having examined the types of the first five species mentioned in the above synonymy, I am unable to separate them specifically; with a fair series of specimens the forms shade one into another. The variety is noteworthy for its banding being ashy and almost black, while in the typical form it is red-brown in various patterns. If *A. vestita* be really this species it takes precedence in date: I have never seen a specimen.

subgen. *BULIMELLA* Pfeiffer.

*Bulimella* Pfeiffer, Malak. Blätt. 1 (1854), p. 119 (as section of *Achatinella*, first species *A. rosea* Swainson).

(18) *Achatinella* (*Bulimella*) *abbreviata* Reeve.

*Achatinella abbreviata* Reeve, Conch. Icon. *Achatinella*, sp. 19; Newcomb, Ann. Lyc. New York, vi. p. 317 [animal].

*Achatinella bacca* Reeve, *loc. cit.* sp. 45; Newcomb, *loc. cit.* p. 318 [animal].

*Achatinella nivosa* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 132, pl. XXII. fig. 6.

*Achatinella* (*Achatinellastrum*) *clementina* Pfeiffer, P. Zool. Soc. London, 1855 [Feb. 1856], p. 205.

HAB. Oahu, Palolo and Konahuanui (Baldwin); Niu (Newcomb); Head of Kawaihoa Gulch (Perkins).

The specimens found are of a puzzling form, shewing links between *clementina* and *colorata*.

The animal, as described by Newcomb, seems to vary a good deal in colour.

(19) *Achatinella* (*Bulimella*) *ampla* Newcomb.

*Achatinella ampla* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 137, pl. XXII. fig. 19.

Mr Baldwin considered this a synonym of *A. colorata* Rve.; the only specimen I have seen is the type, which is somewhat injured, and I incline to place it near *A. abbreviata* Rve.

HAB. Oahu, Koolau (Newcomb).

(20) *Achatinella* (*Bulimella*) *bulimoides* Swainson.

*Achatinella bulimoides* Swainson, Brand's Journ. 1828, p. 85; Zool. Illustr. ser. 2, II. pl. CVIII. fig. 1; Reeve, Conch. Icon. *Achatinella*, sp. 8; Heynemann, Malak. Blätt. XIV. (1867), p. 146, pl. I. fig. 2 [anatomy].

*Achatinella obliqua* Gulick, Ann. Lyc. New York, VI. p. 245, pl. VIII. fig. 63.

*Achatinella oomorpha* Gulick, *t. c.*, p. 246, pl. VIII. fig. 64.

*A. obliqua* was united with this species by Newcomb; Mr Baldwin, however, gives it as distinct. This latter view may be correct, but the two forms are very closely related.

HAB. Oahu, Kahana (Gulick); Kawaihoa (Baldwin).

(21) *Achatinella* (*Bulimella*) *byronii* Wood.

*Helix byronii* Wood, Index Test. Suppl. p. 22, pl. VII. fig. 30.

*Achatinella melanostoma* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 132, pl. XXII. fig. 7.

*Achatinella limbata* Gulick, Ann. Lyc. New York, VI. p. 252, pl. VIII. fig. 70.

*Achatinella mahogani* Gulick, *t. c.*, p. 254, pl. VIII. fig. 72.

*Achatinella pulcherrima* Swainson, Zool. Ill. pl. CXXIII. fig. 2; Gwatkin, P. Ac. Philad. 1895, p. 238 [radula].

HAB. Oahu, Ewa (Newcomb); Ahonui, Kalaikoa (Gulick); Panoa Valley, Halemano, and ridges between Opaepa and Kawaihoa Gulches (Perkins).

var. *recta* Newcomb.

*Achatinella recta* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 143, pl. XXIII. fig. 45.

*Bulimella multicolor* Pfeiffer, *op. cit.* 1855, p. 4, pl. XXX. fig. 11 [*pars, non* fig. 11 a].

HAB. Oahu, Waialua (Newcomb); Halemano and Nuuanu Valley (Perkins).

var. *nympha* Gulick.

*Achatinella nympha* Gulick, Ann. Lyc. New York, VI. p. 251, pl. VIII. fig. 69.

HAB. Oahu, Ahonui, Wahiawa, Halemano, Kawaihoa, Waimea (Gulick); Halemano (Perkins).



The variation is, as usual in the group, very great. A long series collected by Mr Hutchison, added to those of Mr Perkins, has led me to be unable to form any definite break between the various described species which are here placed as varieties. *A. pulcherrima* appears to be a large race in which the colouring has been broken into bands. *A. multicolor* and *A. recta* are, I think, only dwarf varieties. The sinistral shell figured by Pfeiffer (*loc. cit.* pl. xxx. fig. 11a) as a variety of *A. multicolor* belongs really to *A. oviformis*. *A. nymphea* seems a small, elongate, almost colourless variety, with a white lip.

(22) *Achatinella (Bulimella) decipiens* Newcomb.

*Achatinella decipiens* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 153, pl. xxiv. fig. 68; Ann. Lyc. New York, vi. p. 332 [animal].

*Achatinella viridans* Pfeiffer, Mal. Blätt. 1854, p. 121 [nec Mighels, fide Newcomb].

*Achatinella planospira* Pfeiffer, P. Zool. Soc. London, 1855, p. 3, pl. xxx. fig. 8.

*Achatinella herbacea* Gulick, Ann. Lyc. New York, vi. p. 233, pl. viii. fig. 52.

*Achatinella scitula* Gulick, *t. c.* p. 241, pl. viii. fig. 61.

HAB. Oahu, Kahana (Newcomb, Baldwin); Koolauloa (Hartman); Waimea, Kawaihoa, Hakipu (Gulick).

(23) *Achatinella (Bulimella) faba* Pfeiffer.

*Achatinella (Bulimella) faba* Pfeiffer, P. Zool. Soc. London, 1859, p. 30.

HAB. Hawaiian Islands.

I cannot trace this species in the Brit. Mus.; it seems not to have been recognized by any recent author.

(24) *Achatinella (Bulimella) glabra* Newcomb.

*Achatinella glabra* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 139, pl. xxii. fig. 25.

*Achatinella fricki* Pfeiffer, *op. cit.* 1855, p. 3, pl. xxx. fig. 7.

*Achatinella platystyla* Gulick, Ann. Lyc. New York, vi. p. 196, pl. vi. fig. 25.

*Achatinella wheatleyi* Newcomb, MS.

HAB. Oahu, Kawaihoa to Hauula (Baldwin); Koolau poko (Newcomb); Kawaiawa (Hartman); Kawaihoa (Gulick and Perkins).

Only two dead specimens. I think *A. fricki*, which Newcomb placed with *A. ovata*, really belongs here; fig. 7a, however, belongs to *A. ovata*. The determination of *A. wheatleyi* is from specimens so named in the Brit. Mus.

(25) *Achatinella* (*Bulimella*) *elegans* Newcomb.

*Achatinella elegans* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 149, pl. xxiv. fig. 57.

HAB. Oahu, Hauula (Newcomb); Hauula and Kaipapau (Baldwin).

(26) *Achatinella* (*Bulimella*) *luteostoma* Baldwin.

*Achatinella* (*Bulimella*) *luteostoma* Baldwin, P. Ac. Philad. 1895, p. 217, pl. x. figs. 7, 8 [with a note on the animal].

HAB. Oahu, Palolo to Niu (Baldwin).

(27) *Achatinella* (*Bulimella*) *lymaniana* Baldwin.

*Achatinella* (*Bulimella*) *lymaniana* Baldwin, P. Ac. Philad. 1895, p. 219, pl. x. figs. 12, 13.

HAB. Oahu, Waianae mountains (Baldwin).

(28) *Achatinella* (*Bulimella*) *lyonsiana* Baldwin.

*Achatinella* (*Bulimella*) *lyonsiana* Baldwin, P. Ac. Philad. 1895, p. 218, pl. x. figs. 9—11 [with note on animal]; Suter, *t. c.* p. 239, pl. xi. fig. 52 [radula].

HAB. Oahu, Konahuanui mountain (Baldwin).

(29) *Achatinella* (*Bulimella*) *ovata* Newcomb.

*Achatinella ovata* Newcomb, Ann. Lyc. New York, vi. p. 22 [May, 1853]; *T. c.* p. 324 [animal]; P. Zool. Soc. London, 1853, p. 130, pl. xxii. fig. 2.

*Bulimella candida* Pfeiffer, P. Zool. Soc. London, 1855, p. 2, pl. xxx. fig. 4.

*Achatinella phaeozona* Gulick, Ann. Lyc. New York, vi. p. 215, pl. vii. fig. 40.

*Achatinella spadicea* Gulick, *t. c.* p. 247, pl. viii. fig. 65.

*Achatinella lorata* Reeve, Conch. Icon. *Achatinella*, sp. 6 [nec Férussac].

HAB. Oahu, Kahana, Waianae (Newcomb); Kawaihoa (Baldwin); as *A. phaeozona*, Keawaawa, Kailua, Olomana (Gulick); as *A. spadicea*, Kahana (Gulick); Hauula to Kahana (Baldwin).

Gulick's two species are unknown to me. I follow Newcomb in placing them here; Mr Baldwin has, however, given them rank as species.

(30) *Achatinella* (*Bulimella*) *oviformis* (Newcomb) Pfeiffer.

*Achatinella oviformis* Pfeiffer, P. Zool. Soc. London, 1855, p. 208.

*Achatinella multicolor* Pfeiffer, *t. c.* p. 4, pl. xxx. fig. 11 a [nec fig. 11, which equals *A. byronii*, var.].

HAB. Oahu (various authors).

(31) *Achatinella* (*Bulimella*) *rosea* Swainson.

*Achatinella bulimoides* var. *rosea* Swainson, Brand's Journ. 1828, p. 85.

*Achatinella rosea* Swainson, Zool. Illustr. ser. 2, pl. cxxiii. fig. 1; Reeve, Conch. Icon. *Achatinella*, sp. 28; Newcomb, Ann. Lyc. New York, vi. p. 309 [animal].

*Bulimella rosea* Swainson, Hartman, P. Ac. Philad. 1888, p. 30, pl. 1. fig. 4.

A good series, including some varieties approaching *A. ovata*.

HAB. Oahu, Wahiawa to Kawailoa (Baldwin); Waialua (Hartman); Halemano (Perkins).

(32) *Achatinella* (*Bulimella*) *rotunda* Gulick.

*Achatinella rotunda* Gulick, Ann. Lyc. New York, vi. p. 249, pl. viii. fig. 67.

This form has, with much doubt, been allowed specific rank. In this I have followed Mr Baldwin; Newcomb considered it a variety of *A. ovata*.

HAB. Oahu, Kaawa and Kahana (Gulick); Head of Kawailoa (Perkins).

(33) *Achatinella* (*Bulimella*) *rugosa* Newcomb.

*Achatinella rugosa* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 138, pl. xxii. fig. 22.

*Achatinella corrugata* Gulick, Ann. Lyc. New York, vi. p. 248, pl. viii. fig. 66.

*Achatinella torrida* Gulick, *t. c.* p. 250, pl. viii. fig. 68.

I strongly suspect that this will prove to be only a roughened form of *A. byronii* Wood.

HAB. Oahu, Ewa (Newcomb): as *A. corrugata*, Hakipu (Gulick); Kahana (Baldwin): as *A. torrida*, Kahana, Kaawa, Waikane, Waiolu (Gulick).



(34) *Achatinella* (*Bulimella*) *sowerbyana* Pfeiffer.

*Bulimella sowerbyana* Pfeiffer, P. Zool. Soc. London, 1855, p. 4, pl. xxx.  
fig. 14.

var. *fuscobasis* Smith.

*Bulimella fuscobasis* Smith, P. Zool. Soc. London, 1873, p. 77, pl. ix. fig. 15.

I think Mr Smith's species is only a colour variety.

HAB. Oahu (type form, authors); Mount Kaala (variety, Smith).

(35) *Achatinella* (*Bulimella*) *taeniolata* Pfeiffer.

*Achatinella taeniolata* Pfeiffer, P. Zool. Soc. London, 1846, p. 38; Reeve, Conch.  
Icon. *Achatinella*, sp. 7.

*Achatinella rubiginosa* Newcomb, P. Zool. Soc. London, 1854 [1855], p. 154,  
pl. xxiv. fig. 69.

*Bulimella macrostoma* Pfeiffer, P. Zool. Soc. London, 1855, p. 2, pl. xxx.  
fig. 6.

Newcomb was of opinion that *A. macrostoma* was identical with *A. rutila*, but, after examining the type, I prefer to place it here.

HAB. Oahu, Palolo (Newcomb); Niu to Palolo (Baldwin).

(36) *Achatinella* (*Bulimella*) *vidua* Pfeiffer.

*Bulimella vidua* Pfeiffer, P. Zool. Soc. London, 1855, p. 3, pl. xxx. fig. 10.

Newcomb placed this as a synonym of *A. ovata*; Mr Baldwin regarded it as a distinct species. The columellar plait is very small in the specimens in the Brit. Mus.

HAB. Oahu (Baldwin, &c.).

(37) *Achatinella* (*Bulimella*) *viridans* Mighels.

*Achatinella viridans* Mighels, P. Boston Soc. II. (1845), p. 20; Newcomb, P. Zool.  
Soc. London, 1854, p. 310 [animal].

*Achatinella radiata* Pfeiffer, P. Zool. Soc. London, 1845 [1846], p. 89; Reeve,  
Conch. Icon. *Achatinella*, sp. 35.

*Achatinella subvirens* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 136, pl. xxii. fig. 18.

*Achatinella rutila* Newcomb, t. c. p. 138, pl. xxii. fig. 21; Op. cit. 1854, p. 310 [animal]; Ann. Lyc. New York, vi. p. 326 [animal].

HAB. Oahu, Niu (Newcomb); Palolo, Niu, Konahuanui (Hartman); Nuuanu to Waialae (Baldwin); Nuuanu, Waialae (Perkins).

subgen. PARTULINA Pfeiffer.

*Partulina* Pfeiffer, Malak. Blätt. I. 1854, p. 114.

Pfeiffer had no fixed type for his section, but the species all belong to one group, and I would suggest that his first-named, *A. virgulata* Migh., be treated as the type.

Pease, in his review of the genus in 1869, did not alter the grouping, so far as regards *Partulina*.

Mons. Ancey has recently (P. Malac. Soc. London, III. 1899, p. 270) proposed to place *P. physa* Newc., and its allies, in a new subgenus *Baldwinia*.

(38) *Achatinella (Partulina) anceyana* Baldwin.

*Achatinella (Partulina) anceyana* Baldwin, P. Ac. Philad. 1895, p. 223, pl. x. fig. 16; Gwatkin, t. c. p. 238 [radula].

HAB. Maui, Makawao (Baldwin).

(39) *Achatinella (Partulina) aptycha* Pfeiffer.

*Achatinella (Newcombia) aptycha* Pfeiffer, P. Zool. Soc. London, 1855 [March], p. 1, pl. xxx. fig. 1.

HAB. Hawaiian Islands. Probably from Maui.

(40) *Achatinella (Partulina) compta* Pease.

*Partulina compta* Pease, J. Conchyl. xvii. 1869, p. 175.

Curiously enough some specimens collected on Maui, and sent to me by Mr Baldwin, exactly agree with a specimen from Molokai presented by Pease to the British Museum under this name.

HAB. Molokai (Pease); Kawela (Baldwin)—Maui (Baldwin).

(41) *Achatinella (Partulina) confusa* nom. nov.

*Achatinella physa* Newcomb, P. Boston Soc. v. 1855, p. 218; Amer. J. Conch. II. 1866, p. 214, pl. XIII. fig. 10.

*Achatinella (Partulina) physa* Newcomb, Baldwin, P. Ac. Philad. 1895, p. 225 [animal].

Nec *A. physa* Newcomb, 1854, q. v. (p. 316).

An inspection of the figures and descriptions given by Newcomb (P. Zool. Soc. London, 1853, p. 152, pl. XXIV. fig. 64, and as given above) will, I think, show that he was confusing two species, under the belief that the first description related only to a young specimen. It therefore becomes necessary to restrict his name to the species he first referred to, which unfortunately appears to be the same as *A. hawaiiensis* Baldwin, and to rename the other form, which, it is to be regretted, is the species universally known as *A. physa*. It may be noted that the habitat originally given by Newcomb agrees with that of Hamakua given by Mr Baldwin for his *A. hawaiiensis*, whilst Kohala is a different, but adjoining, district.

HAB. Hawaii, Kohala (Newcomb).

(42) *Achatinella (Partulina) crassa* Newcomb.

*Achatinella crassa* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 155, pl. XXIV. fig. 71.

HAB. Lanai (Newcomb); near Koele (Perkins).

(43) *Achatinella (Partulina) dolei* Baldwin.

*Achatinella (Partulina) dolei* Baldwin, P. Ac. Philad. 1895, p. 221, pl. x. figs. 17, 18; Suter, t. c. p. 238, pl. XI. fig. 55 [radula].

Belongs to the group of *A. tappaniana* C. B. Ad.; specimens, precisely similar to some kindly sent me by Mr Baldwin, were identified by Mr Gulick as a variety of his *A. fasciata* (= *tappaniana*).

HAB. Maui, Honomanu (Baldwin).

(44) *Achatinella (Partulina) dubia* Newcomb.

*Achatinella dubia* Newcomb, Ann. Lyc. New York, VI. p. 23 (May, 1853); P. Zool. Soc. London, 1853 [1854], p. 152, pl. XXIV. fig. 65.

HAB. Oahu, among stones, and Waianae on bushes (Newcomb); Makaha Valley, Waianae Mts (Perkins).



(45) *Achatinella (Partulina) dwightii* Newcomb.

*Achatinella dwightii* Newcomb, Ann. Lyc. New York, vi. p. 145 (Oct. 1855); Amer. J. Conch. ii. p. 213, pl. XIII. fig. 9; Gwatkin, P. Ac. Philad. 1895, p. 238 [radula].

Closely related, apparently, to some of the varieties of *A. redfieldi* Newc.

HAB. Molokai, Kamalo (Baldwin); Mountains (Perkins).

(46) *Achatinella (Partulina) fusioidea* Newcomb.

*Achatinella fusioidea* Newcomb, Ann. Lyc. New York, vi. p. 144 (Oct. 1855); Amer. J. Conch. ii. 1866, p. 213, pl. XIII. fig. 8.

HAB. Maui, Haleakala (Newcomb).

(47) *Achatinella (Partulina) gouldi* Newcomb.

*Achatinella gouldi* Newcomb, Ann. Lyc. New York, vi. p. 21 (May 1853); P. Zool. Soc. London, 1853 [1854], p. 129, pl. XXII. fig. 1.

*Achatinella talpina* Gulick, Ann. Lyc. New York, vi. p. 212, pl. VII. fig. 38 (Dec. 1856).

*Achatinella myrrhea* Gulick, Pfeiffer, Mon. Helic. Viv. iv. p. 517.

HAB. Maui, on Tutui trees, Wailuku Valley (Newcomb); Wailuku (Gulick).

(48) *Achatinella (Partulina) grisea* Newcomb.

*Achatinella grisea* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 153, pl. XXIV. fig. 66.

HAB. Maui, Makawao (Newcomb, &c.).

(49) *Achatinella (Partulina) hayseldeni* Baldwin.

*Partulina hayseldeni* Baldwin, Nautilus, x. p. 31, July 1896.

Plate XI. fig. 2.

Belongs to the group of *A. variabilis* Newc.

HAB. Lanai (Baldwin); Lanaihale, near highest point of Mountains (Perkins).

(50) *Achatinella (Partulina) horneri* Baldwin.

*Achatinella (Partulina) horneri* Baldwin, P. Ac. Philad. 1895, p. 224, pl. x. figs. 20, 21, 22; Gwatkin, t. c. p. 238 [radula].

HAB. Hawaii, Hamakua (Baldwin).

(51) *Achatinella* (*Partulina*) *lignaria* Gulick.

*Achatinella lignaria* Gulick, Ann. Lyc. New York, vi. p. 209, pl. vii. fig. 35 (Dec. 1856).

HAB. Maui, Wailuku (Gulick).

var. *crocea* Gulick.

*Achatinella crocea* Gulick, t. c. p. 211, pl. vii. fig. 36 (Dec. 1856).

I think *A. crocea* is only a variety; both were placed by Newcomb as synonyms of his *A. terebra*.

HAB. Maui, Waihee (Gulick).

(52) *Achatinella* (*Partulina*) *marmorata* Gould.

*Achatinella marmorata* Gould, P. Boston Soc. ii. p. 200 (1847); U. S. Explor. Exped. Moll. fig. 94; Newcomb, Ann. Lyc. New York, vi. p. 311 [animal]; Gwatkin, P. Ac. Philad. 1895, p. 238 [radula].

*Achatinella adamsi* Newcomb, Ann. Lyc. New York, vi. p. 19 (May, 1853); P. Zool. Soc. London, 1853 [1854], p. 137, pl. xxii. fig. 20 (as *A. adamsi*).

*Achatinella induta* Gulick, Ann. Lyc. New York, vi. p. 207, pl. vii. fig. 34 (Dec. 1856).

The synonymy of this species is difficult; Newcomb united two other forms described by Gulick from a different district of Maui; Mr Baldwin on the other hand regards them as species. For the present I have left them, with some hesitation, specific rank; they are *A. ustulata* and *A. plumbea*.

HAB. Maui, Haleakala (Gould); Makawao (Newcomb, Baldwin); Wailuku (Gulick).

(53) *Achatinella* (*Partulina*) *mighelsiana* Pfeiffer.

*Achatinella mighelsiana* Pfeiffer, Mon. Hel. Viv. ii. p. 238; Newcomb, Ann. Lyc. New York, vi. p. 319 [animal]; Gwatkin, P. Ac. Philad. 1895, p. 238 [radula]; Reeve, Conch. Icon. *Achatinella*, sp. 40.

The typical form is a whitish shell with a single black band at the periphery; this single band is occasionally split into two smaller ones. Some lovely varieties were collected by Mr Perkins, which may be tabulated as follows:

(a) White and bandless.

(β) Bandless, of a rich orange hue with strigations of a slightly darker shade, tubercle white.

( $\gamma$ ) One-banded, the whitish shell tinted with yellow, ashy, or slaty strigations. A few are white above the band, yellowish below, and show traces of a second band in the umbilical area.

( $\delta$ ) Two- and even three-banded, ground-colouring white, tinted faintly with ashy strigations, shell not quite so attenuate.

HAB. Molokai, Kalae (Baldwin); the Mountains (Perkins).

(54) *Achatinella* (*Partulina*) *morbida* Pfeiffer.

*Achatinella* (*Bulimella*) *morbida* Pfeiffer, P. Zool. Soc. London, 1859, p. 30.

HAB. ? Oahu.

The only authority I am aware of for the exact habitat is Mr Baldwin, who gives Oahu, but he marks it as one of the species he has not seen.

(55) *Achatinella* (*Partulina*) *mucida* Baldwin.

*Achatinella* (*Partulina*) *mucida* Baldwin, P. Ac. Philad. 1895, p. 222, pl. x. fig. 23.

A series of about 60 specimens. It is generally of an ashy colour with a dark zone at the periphery; smaller colour lines are also present in most specimens. The brown stain at the base of the columellar plait is also noteworthy.

HAB. Molokai, Makakupaia (Baldwin); Makakupaia, and Mountains of Molokai (Perkins).

(56) *Achatinella* (*Partulina*) *nivea* Baldwin.

*Achatinella* (*Partulina*) *nivea* Baldwin, P. Ac. Philad. 1895, p. 222, pl. x. fig. 19.

HAB. Maui, Makawao to Huelo (Baldwin).

(57) *Achatinella* (*Partulina*) *perdix* Reeve.

*Achatinella* *perdix* Reeve, Conch. Icon. *Achatinella*, sp. 43 (1850); Newcomb, Ann. Lyc. New York, vi. p. 317 [animal]; Gwatkin, P. Ac. Philad. 1895, p. 238 [radula].

*Achatinella undosa* Gulick, Ann. Lyc. New York, vi. p. 205, pl. vii. fig. 33 (Dec. 1856).

*A. undosa* was wrongly placed by Clessin (Nom. Helic. Viv. p. 305) as a synonym of *A. radiata* Gould.

HAB. Maui, Lahaina (Baldwin); Olinda at 4000 ft. (Perkins).



(58) *Achatinella* (*Partulina*) *physa* Newcomb.

*Achatinella physa* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 152, pl. xxiv. fig. 64.

*Achatinella* (*Partulina*) *hawaiiensis* Baldwin, P. Ac. Philad. 1895, p. 225, pl. x. figs. 24—26; Gwatkin, t. c. p. 238 [radula].

Nec *A. physa* Newc. subsequently.

See for notes on the synonymy under *A. confusa* Sykes.

HAB. Hawaii, Mauna Kea (Newcomb); Hamakua (Baldwin).

(59) *Achatinella* (*Partulina*) *plumbea* Gulick.

*Achatinella plumbea* Gulick, Ann. Lyc. New York, vi. p. 213, pl. vii. fig. 39.

HAB. Maui, Kula (Gulick).

(60) *Achatinella* (*Partulina*) *porcellana* Newcomb.

*Achatinella porcellana* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 146, pl. xxiii. fig. 47.

In appearance recalling a dwarf specimen of *A. terebra* Newc. of W. Maui; only known to me from the type.

HAB. E. Maui (Newcomb).

(61) *Achatinella* (*Partulina*) *proxima* Pease.

*Helicter proximus* Pease, P. Zool. Soc. London, 1862, p. 6.

*Partulina proxima* Pease, Hartman, P. Ac. Philad. 1888, p. 27, pl. i. figs. 1, 2.

*Achatinella proxima* Pease, Gwatkin, l. c. 1895, p. 238 [radula].

A fine series. A variety is interesting as showing a link towards *A. theodorei* Baldwin; it is much more slender and smaller than the typical form, generally lighter in colour, and the colour-markings are much finer in pattern. It was found with the typical form.

HAB. Molokai, Waikolu (Baldwin); Kahanui, and mountains of Molokai (Perkins).

(62) *Achatinella (Partulina) pyramidalis* Gulick.

*Achatinella pyramidalis* Gulick, Ann. Lyc. New York, vi. p. 204, pl. vii. fig. 32 (Dec. 1856).

Newcomb regarded this as a variety of *A. perdix* Reeve; not having seen specimens which unite them I have left it as a species. Clessin (Nom. Helic. Viv. p. 306) placed it—erroneously—under *A. marmorata* Gould.

HAB. Maui, Lahaina (Gulick); Huelo (Baldwin); Waihee (Perkins).

(63) *Achatinella (Partulina) radiata* Gould.

*Achatinella radiata* Gould, P. Boston Soc. II. 1845, p. 27.

*Bulimus gouldi* Pfeiffer, Zeitsch. für Malak. 1846, p. 116.

*Partula densilineata* Reeve, Conch. Icon. *Partula*, sp. 9.

HAB. ? Maui (Baldwin).

The specimens in the British Museum are labelled "Oahu", but probably this is erroneous and Maui is the correct habitat.

(64) *Achatinella (Partulina) redfieldi* Newcomb.

*Achatinella redfieldi* Newcomb, Ann. Lyc. New York, vi. (May 1853), p. 22; t. c. p. 325 [animal]; P. Zool. Soc. London, 1853 [1854], p. 131, pl. xxii. fig. 5; Gwatkin, P. Ac. Philad. 1895, p. 238 [radula].

The long series collected by Mr Perkins has given me considerable difficulty. Newcomb originally gave both Maui and Molokai, Clessin (Nom. Helic. Viv. p. 306) gave Molokai and Kauai (the latter being obviously wrong), and Mr Baldwin gives Mapulehu, Molokai. I think Maui was a slip, due to confusion with the very closely allied *A. splendida*, and that *A. redfieldi* is really a Molokai shell. Next arises the question of what the typical form may be; Newcomb states that the shell is either plain or banded on the third whorl *only*, while he gives six as the number of whorls, the shell figured being banded (as *A. splendida*) on all the whorls. The forms I refer to this species are:

α. Typical (Plate XI. fig. 15). Varies from nearly white to chestnut, sometimes being particoloured.

HAB. Makakupaia, Molokai (Perkins).

β. Light to dark fawn colour, banded with brown, the lip being sometimes white. This is the form figured by Newcomb.

HAB. Molokai, towards or above Kamalo (Perkins).

γ. Lip white, shell chestnut, a white band at the periphery and often a smaller one above it, upper whorls finely tessellated. (Plate XI. fig. 16.)

HAB. Molokai, Makakupaia and Kamalo (Perkins).

(65) *Achatinella* (*Partulina*) *rufa* Newcomb.

*Achatinella rufa* Newcomb, Ann. Lyc. New York, vi. p. 21 (May 1853); t. c. p. 324 [animal]; P. Zool. Soc. London, 1853 [1854], p. 130, pl. xxii. fig. 3.

HAB. Molokai, Kalae (Baldwin); mountains (Perkins).

Dr Hartman gave, erroneously, Maui for this shell. The figure is not good, being too elongate and too highly coloured: a pale variety exists.

(66) *Achatinella* (*Partulina*) *splendida* Newcomb.

*Achatinella splendida* Newcomb, Ann. Lyc. New York, vi. p. 20 (May, 1853); P. Zool. Soc. London, 1853 [1854], p. 131, pl. xxii. fig. 4.

*Achatinella baileyana* Gulick, Ann. Lyc. New York, vi. p. 202, pl. vii. fig. 31 (1856).

*Achatinella solida* Gulick, Pfeiffer, Mon. Helic. Viv. iv. p. 516.

HAB. Maui, Wailuku (Newcomb, &c.); Lahaina and Wailuku (Baldwin).

(67) *Achatinella* (*Partulina*) *tappaniana* C. B. Adams.

*Achatinella tappaniana* C. B. Adams, Contrib. to Conch. p. 126 (1850) [with var. *dubiosa*].

*Achatinella cburnea* Gulick, Ann. Lyc. New York, vi. p. 199, pl. vi. fig. 28; Gwatkin, P. Ac. Philad. 1895, p. 238 [radula].

*Achatinella ampulla* Gulick, t. c. p. 200, pl. vii. fig. 29.

*Achatinella fasciata* Gulick, t. c. p. 201, pl. vii. fig. 30.

*Achatinella tuba* Gulick, Pfeiffer, Mon. Helic. Viv. iv. p. 523.

HAB. Maui, (as *A. tappaniana*) Lahaina (Baldwin); (as *A. cburnea*) Honuaula (Gulick); (as *A. ampulla* and *A. fasciata*) Honukawai (Gulick).



(68) *Achatinella (Partulina) terebra* Newcomb.

*Achatinella terebra* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 144, pl. xxiii. fig. 40.

*Bulimella attenuata* Pfeiffer, P. Zool. Soc. London, 1855 [March], p. 4, pl. xxx. fig. 12.

*Achatinella corusca* Gulick, Pfeiffer, Mon. Helic. Viv. iv. p. 525.

*Achatinella perforata* Gulick, Pfeiffer, pag. cit.

HAB. Maui; W. Maui (Newcomb); Wailuku (Hartman); Honokowai (Baldwin).

(69) *Achatinella (Partulina) tessellata* Newcomb.

*Achatinella tessellata* Newcomb, Ann. Lyc. New York, vi. (May, 1853), p. 19; t. c. p. 327 [animal]; P. Zool. Soc. London, 1853 [1854], p. 139, pl. xxiii. fig. 26; Gwatkin, P. Ac. Philad. 1895, p. 238 [radula].

A very fine series. The forms found at Pelekunu are generally dextral and of large size; recalling in shape and colouring *A. virgulata*, but as they possess the mottled colouring of the earlier whorls, so characteristic of the present species, I have placed them here.

HAB. Molokai, Kalae to Waikolu (Baldwin); Pelekunu, Makakupaia, Kahanui, &c. (Perkins).

(70) *Achatinella (Partulina) ustulata* Gulick.

*Achatinella ustulata* Gulick, Ann. Lyc. New York, vi. p. 211, pl. vii. fig. 37.

Nec *A. ustulata* Newcomb MS.; fide Pfeiffer, Malak. Blätt. i. p. 136 (= *A. colorata* Reeve).

HAB. Maui, Beautiful Valley (Gulick); Lahaina (Baldwin).

(71) *Achatinella (Partulina) variabilis* Newc.

*Achatinella variabilis* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 154, pl. xxiv. fig. 70.

*Achatinella fulva* (Newcomb) Pfeiffer, loc. cit. 1855 [1856], p. 208.

*Achatinella lactea* Gulick, Ann. Lyc. New York, vi. 1858, p. 198, pl. vi. fig. 27 [bad].

HAB. Lanai (Newcomb, &c.); windward side on ridges facing Maui, above Waiapaa, behind Koele, and Lanaihale (Perkins).

var. *semicarinata* Newc.

*Achatinella semicarinata* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 156, pl. xxiv. fig. 76.

From an examination of the very fine series collected by Mr Perkins, I think Newcomb was quite right in placing *A. fulva* and *A. lactea* in the synonymy. The former is a straw-coloured form without banding and the latter a white form with a reddish-brown stain in the interior of the aperture. Mr Baldwin remarks that *A. variabilis* is 'invariably dextral,' but sinistral specimens, typical in every other respect, were found by Mr Perkins. In placing *A. semicarinata* as a variety I have been guided by the great difficulty I found in endeavouring to separate this form from *A. fulva*, the type specimens of which shew traces of the carina.

Mr Perkins remarks that 'the broader form with ridge more raised' is 'from higher elevations': it appears to be gradually replaced by the form *fulva* at lower altitudes and this latter shades into *A. variabilis* (typical).

HAB. Lanai (Newcomb, &c.); mountains (Perkins).

(72) *Achatinella* (*Partulina*) *virgulata* Mighels.

*Partula virgulata* Mighels, P. Boston Soc. II. 1845, p. 20.

*Achatinella virgulata* Mighels, Reeve, Conch. Icon. *Achatinella*, sp. 3; Newcomb, Ann. Lyc. New York, vi. p. 312 [animal]; Gwatkin, P. Ac. Philad. 1895, p. 238 [radula].

*Bulimus rohri* Pfeiffer, Zeitsch. f. Malak. 1846, p. 115.

*Bulimus insignis* Mighels, Reeve, Conch. Icon. *Achatinella*, sp. 3.

HAB. Molokai, Kaluaaha to Halawa (Baldwin); Mapulehu and mountains (Perkins).

It is a very variable species and the following, which I take to be a variety, is perhaps worthy of note.

var. *a*. Either entirely white or slightly tinted with brown on the last whorl; mouth varying from dusky to white; the spiral black line on the upper whorls either present or absent.

HAB. Molokai, Pelekunu (Perkins).

subgen. ACHATINELLASTRUM Pfeiffer.

*Achatinellastrum* Pfr., Malak. Blätt. I. (1854), p. 133 (first species *A. venulata* Newc.).

(73) *Achatinella* (*Achatinellastrum*) *angusta* Smith.

*Achatinella angusta* Smith, P. Zool. Soc. London, 1873, p. 74, pl. ix. fig. 7.

Dr Hartman referred this shell, as *A. angusta*, to *A. fulgens* Newc.

HAB. Oahu, Waialae, Waialupe, Palolo (Smith).

(74) *Achatinella* (*Achatinellastrum*) *bella* Reeve.

*Achatinella bella* Reeve, Conch. Icon. *Achatinella*, sp. 17; Newcomb, Ann. Lyc. New York, vi. p. 316 [animal]; Gwatkin, P. Ac. Philad. 1895, p. 238 [radula].

Pease (P. Zool. Soc. 1869, p. 652) united the species, I think erroneously, with *A. polita* Newc.

HAB. Molokai (various authors and Perkins); Kalae to Waikolu (Baldwin).

(75) *Achatinella* (*Achatinellastrum*) *bilineata* Reeve.

*Achatinella bilineata* Reeve, Conch. Icon. *Achatinella*, sp. 22.

*Achatinella johnsoni* Newcomb, P. Zool. Soc. London, 1854, p. 147, pl. xxiii. fig. 50.

*Achatinella aplustre* Newcomb, t. c. p. 147, pl. xxiii. fig. 51.

HAB. Oahu, Koolau (Newcomb); Manoa to Nuuanu (Baldwin).

(76) *Achatinella* (*Achatinellastrum*) *buddii* Newcomb.

*Achatinella buddii* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 155, pl. xxiv. fig. 73.

*Achatinella pexa* Gulick, Ann. Lyc. New York, vi. p. 197, pl. vi. fig. 26.

*Achatinella plumata* Gulick, t. c. p. 217, pl. vii. fig. 41.

*Achatinella caesia* Gulick, t. c. p. 234, pl. viii. fig. 53.

*Achatinella fuscozona* Smith, P. Zool. Soc. London, 1873, p. 76, pl. ix. fig. 9.

I follow Mr Baldwin in uniting Mr Smith's species, with which I am unacquainted. Dr Hartman (P. Ac. Philad. 1888) places it (on p. 32) amongst the synonyms of *A. buddii*; possibly this may be a slip as further on (p. 33) he leaves it specific rank, remarking 'this may be a good species, though it approaches very near to *A. fusco-lineata*, Smith,' a comparison which appears to me inaccurate.

HAB. Oahu, Palolo (Newcomb); Niu, Wailupe, Waialae, Palolo, Kailua, and Waimea (Gulick); Makiki, Palolo (Smith).



(77) *Achatinella* (*Achatinellastrum*) *casta* Newcomb.

*Achatinella casta* Newcomb, P. Zool. Soc. London, 1853, p. 134, pl. xxii. fig. 12.

*Achatinella juncea* Gulick, Ann. Lyc. New York, vi. p. 230, pl. vii. fig. 49.

*Achatinella cognata* Gulick, t. c. p. 240, pl. viii. fig. 60.

*A. cognata* is only known to me from the description: I incline to think Newcomb was right in suppressing it as a species; Mr Baldwin, however, considers it distinct.

HAB. Oahu, Ewa (Newcomb, Baldwin); Kalaikoa, Wahiawa, Halemano, Haiki-puu, and Waikane (Gulick); above Ewa (Perkins).

(78) *Achatinella* (*Achatinellastrum*) *cervina* Gulick.

*Achatinella cervina* Gulick, Ann. Lyc. New York, vi. p. 241, pl. viii. fig. 62.

Newcomb placed it as a variety of *A. ovata*; Mr Baldwin, on the other hand, gives it rank as a species and places it in *Achatinellastrum*. If the specimens in the Brit. Mus. are correctly identified, it is very close to *A. buddii* Newc.

HAB. Oahu, Kahana (Gulick).

(79) *Achatinella* (*Achatinellastrum*) *colorata* Rve.

*Achatinella colorata* Reeve, Conch. Icon. *Achatinella*, sp. 18; Newcomb, Ann. Lyc. New York, vi. p. 316 [animal].

HAB. Oahu, Ahuimanu (Hartman); Kalihi (Baldwin).

(80) *Achatinella* (*Achatinellastrum*) *concolor* Smith.

*Achatinella concolor* Smith, P. Zool. Soc. London, 1873, p. 75, pl. ix. fig. 1.

Dr Hartman considered it to be a form of *A. colorata* Rve.

HAB. Oahu, Ewa (Smith).

(81) *Achatinella* (*Achatinellastrum*) *cucumis* Gulick.

*Achatinella cucumis* Gulick, Ann. Lyc. New York, vi. p. 225, pl. vii. fig. 45.

HAB. Oahu, Kalihi (Gulick); Kalihi to Moanalua (Baldwin); Kaliua (sic) (Hartman).

(82) *Achatinella* (*Achatinellastrum*) *cuneus* Pfeiffer.

*Achatinella* (*Achatinellastrum*) *cuneus* Pfeiffer, P. Zool. Soc. London, 1855, p. 205.

Newcomb considered this a form of *A. decipiens*; Dr Hartman appears to have been in some confusion, as he placed it (P. Ac. Philad. 1888) at p. 29 under *A. decipiens*, and at p. 30 under *A. viridans*. I have seen a long and characteristic series found on the Island of Oahu by Mr Hutchison.

HAB. Oahu (authors); Halawa (Baldwin); mountains behind Ewa (Perkins).

(83) *Achatinella* (*Achatinellastrum*) *curta* Newc.

*Achatinella curta* Newcomb, P. Zool. Soc. London, 1853, p. 144, pl. xxiii. fig. 43.

*Achatinella undulata* Newcomb, P. Boston Soc. v. (1855), p. 219; Amer. J. Conch. ii. (1866), p. 216, pl. xiii. fig. 15; Pfeiffer, P. Zool. Soc. London, 1855, p. 208.

*Achatinella dimorpha* Gulick, Ann. Lyc. New York, vi. p. 236, pl. viii. fig. 56.

*Achatinella albescens* Gulick, t. c. p. 237, pl. viii. fig. 57.

*Achatinella contracta* Gulick, t. c. p. 239, pl. viii. fig. 59.

*Achatinella rhodoraphe* Smith, P. Zool. Soc. London, 1873, p. 75, pl. ix. fig. 10; Gwatkin, P. Ac. Philad. 1895, p. 238 [radula].

*Achatinella pygmaea* Smith, P. Zool. Soc. London, 1873, p. 75, pl. ix. fig. 11.

HAB. Oahu, Waialua (Newcomb); various localities (Gulick); Halemano, Waipio, &c. (Smith); between Kawailoa and Waala gulches, generally between Kawailoa and Halemano, Waimea (Perkins).

(84) *Achatinella* (*Achatinellastrum*) *delta* Gulick.

*Achatinella delta* Gulick, Ann. Lyc. New York, vi. p. 231, pl. viii. fig. 50.

Newcomb considered *A. delta* to be a more banded variety of *A. curta* Newc.; from the material I have seen I incline, with doubt, to leave them distinct.

HAB. Oahu, Kalaikoa, Halemano, &c. (Gulick).

(85) *Achatinella* (*Achatinellastrum*) *diluta* Smith.

*Achatinella diluta* Smith, P. Zool. Soc. London, 1873, p. 75, pl. ix. fig. 14.

It is near to, but seems distinct from, *A. ligata* Smith, with which Dr Hartman placed it.

HAB. Oahu, probably (Smith).

(86) *Achatinella* (*Achatinellastrum*) *ernestina* Baldwin.

*Achatinella* (*Achatinellastrum*) *ernestina* Baldwin, P. Ac. Philad. 1895, p. 217, pl. x. figs. 5, 6 [animal described].

HAB. Oahu, Nuuanu Valley (Baldwin).

(87) *Achatinella* (*Achatinellastrum*) *formosa* Gulick.

*Achatinella formosa* Gulick, Ann. Lyc. New York, vi. p. 235, pl. viii. fig. 55.

HAB. Oahu, Waimea (Gulick).

(88) *Achatinella* (*Achatinellastrum*) *fulgens* Newc.

*Achatinella fulgens* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 131, pl. xxii. fig. 24.

HAB. Oahu, Niu (Newcomb); Waialua, south-east end (Hartman).

(89) *Achatinella* (*Achatinellastrum*) *germana* Newcomb.

*Achatinella germana* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 151, pl. xxiv. fig. 61.

HAB. Maui, Makawao (Newcomb).

(90) *Achatinella* (*Achatinellastrum*) *juddii* Baldwin.

*Achatinella* (*Achatinellastrum*) *juddii* Baldwin, P. Ac. Philad. 1895, p. 216, pl. x. figs. 3, 4.

HAB. Oahu, Halawa (Baldwin).

(91) *Achatinella* (*Achatinellastrum*) *lehuensis* Smith.

*Achatinella lehuensis* Smith, P. Zool. Soc. London, 1873, p. 76, pl. ix. fig. 4.

I have not seen the species, but it appears from the figure to be near *A. zonata* Gulick; Dr Hartman has suggested that it is a form of *A. multicolor* Pfr. (= *oviformis* Pfr.).

HAB. Oahu, Lehui (Smith).



(92) *Achatinella* (*Achatinellastrum*) *ligata* Smith.*Achatinella ligata* Smith, P. Zool. Soc. London, 1873, p. 76, pl. ix. fig. 13.*Achatinella bellula* Smith, t. c. p. 77, pl. ix. fig. 8.

I fancy these two forms are only varieties of one species; they approach *A. nymphea* Gulick.

HAB. Oahu, Waimolu (Smith); Panoa and Nuuanu (Baldwin); ridges round Nuuanu, Waimea, and beyond head of Panoa Valley (Perkins).

(93) *Achatinella* (*Achatinellastrum*) *livida* Swainson.*Achatinella livida* Swainson, Zool. Ill. pl. cviii. fig. 2.*Achatinella emmersonii* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 156, pl. xxiv. fig. 74.*Achatinella viridans* Reeve, Conch. Icon. *Achatinella*, sp. 25 [nec Mighels].*Achatinella reevei* C. B. Adams, Contrib. to Conch. 1850, p. 128.*Achatinella consanguinea* Smith, P. Zool. Soc. London, 1873, p. 73, pl. ix. fig. 3.Nec *A. livida* Pfeiffer, P. Zool. Soc. London, 1845, p. 89 [= *A. vulpina* Fér.].

According to Dr Hartman, Mr Smith's species is probably a variety of *A. colorata*; from the specimens I have seen, I think it rather belongs here.

HAB. Oahu, Waialua (Newcomb, Baldwin); Ahuimanu (Smith).

(94) *Achatinella* (*Achatinellastrum*) *longispira* Smith.*Achatinella longispira* Smith, P. Zool. Soc. London, 1873, p. 73, pl. ix. fig. 5.

Placed by Dr Hartman as a synonym of *A. vulpina*, but the present species is much more slender in form; I should be inclined rather to refer it to the group of *A. olivacea*.

HAB. Oahu, Halawa, Ahuimanu (?) (Smith).

(95) *Achatinella* (*Achatinellastrum*) *multizonata* Baldwin.*Achatinella* (*Achatinellastrum*) *multizonata* Baldwin, P. Ac. Philad. 1895, p. 215, pl. x. figs. 1, 2 [animal described].

The shells collected by Mr Perkins from 'round Nuuanu' are in no sense typical of this species, they appear to be forms shewing links between it and *A. bellula* Smith (= *ligata* Smith); indeed the two may prove to be forms of one variable species.

HAB. Oahu, Nuuanu Valley (Baldwin); ridges round Nuuanu and Waimea (Perkins).

(96) *Achatinella* (*Achatinellastrum*) *nattii* Baldwin and Hartman.

*Achatinella nattii* Baldwin and Hartman in Hartman, P. Ac. Philad. 1888, p. 34, pl. I. fig. 3 [as *nealii* in explanation of plate]; Gwatkin, l. c. 1895, p. 238. [radula].

HAB. Maui, Makawao to Honomu (Baldwin).

(97) *Achatinella* (*Achatinellastrum*) *olivacca* Reeve.

*Achatinella olivacca* Reeve, Conch. Icon. *Achatinella*, sp. 20.

*Achatinella prasina* Reeve, l. c. sp. 27.

HAB. Oahu, Manoa to Nuuanu (Baldwin); Nuuanu and Mt. Tantalus (Perkins).

(98) *Achatinella* (*Achatinellastrum*) *papyracea* Gulick.

*Achatinella papyracea* Gulick, Ann. Lyc. New York, vi. p. 229, pl. VII. fig. 48.

HAB. Oahu, Kalaikoa, Ahonui, Wahiawa (Gulick).

(99) *Achatinella* (*Achatinellastrum*) *polita* Newcomb.

*Achatinella polita* Newcomb, Ann. Lyc. New York, vi. p. 24 (1853, May); t. c. p. 328 [animal].

Pease considered this to be identical with *A. bella*.

HAB. Molokai (Newcomb); Kaluaaha to Halawa (Baldwin).

(100) *Achatinella* (*Achatinellastrum*) *producta* Reeve.

*Achatinella producta* Reeve, Conch. Icon. *Achatinella*, sp. 13; Newcomb, Ann. Lyc. New York, vi. p. 315 [animal]; Bland and Binney, Ann. Lyc. New York, x. p. 336, pl. xv. figs. 2, 4 [radula and anatomy].

*Achatinella venulata* Newcomb, P. Zool. Soc. London, 1854, p. 146, pl. XXIII. fig. 48.

*Achatinella hybrida* Newcomb, t. c. p. 147, pl. XXIII. fig. 52.

*Achatinella dunkeri* (Cuming MS.) Pfeiffer, op. cit. 1855, p. 208.

HAB. Oahu, Koolau (Newcomb, Hartman); Manoa to Nuuanu (Baldwin).

(101) *Achatinella* (*Achatinellastrum*) *saccata* Pfeiffer.

*Achatinella* (*Achatinellastrum*) *saccata* Pfeiffer, P. Zool. Soc. London, 1859, p. 30.  
Unknown to me.

HAB. Hawaiian Isles (Pfeiffer); Oahu (?) (Baldwin).

(102) *Achatinella* (*Achatinellastrum*) *solitaria* Newcomb.

*Achatinella solitaria* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 150,  
pl. XXIV. fig. 60.

HAB. Oahu, Palolo (Newcomb).

(103) *Achatinella* (*Achatinellastrum*) *trilineata* Gulick.

*Achatinella trilineata* Gulick, Ann. Lyc. New York, VI. p. 226, pl. VII. fig. 46.

HAB. Oahu, Palolo, Waialae, Wailupe, and Niu (Gulick).

(104) *Achatinella* (*Achatinellastrum*) *versipellis* Gulick.

*Achatinella versipellis* Gulick, Ann. Lyc. New York, VI. p. 224, pl. VII. fig. 44.

HAB. Oahu, Kailua (Gulick).

(105) *Achatinella* (*Achatinellastrum*) *vulpina* Férussac.

*Helix vulpina* Férussac, Voy. Freycinet, Zool. p. 447, pl. LXVIII. figs. 13, 14;  
Souleyet, Voy. Bonite, Zool. II. p. 508, pl. XXIX. figs. 3, 4 [animal].

*Achatina vulpina* Férussac, Deshayes, Hist. Moll. II. pt. 2, p. 193, pl. CLV. fig. 1.

*Achatinella vulpina* Reeve, Conch. Icon. *Achatinella*, sp. 29.

*Achatinella castanea* Reeve, l. c. sp. 24.

*Achatinella adusta* Reeve, l. c. sp. 30.

*Achatinella virens* Gulick, Ann. Lyc. New York, VI. p. 254, pl. VIII. fig. 73 (1858).

*Achatinella fuscolineata* Smith, P. Zool. Soc. London, 1873, p. 75, pl. IX. fig. 2.

*Achatinella livida* Pfeiffer, P. Zool. Soc. London, 1845, p. 89 [nec Swainson].

HAB. Oahu, Palolo (Baldwin); Kailua, Palolo, Halawa (Smith); Manoa to Nuuanu (Baldwin); Nuuanu Valley and Mt. Tantalus (Perkins).



var. *stewarti* Green.

*Achatina stewarti* Green, Contrib. Macl. Lyc. Philad. 1. (1827, July), p. 47, pl. iv. figs. 1—4.

*Achatinella stewarti* Green, Reeve, Conch. Icon. *Achatinella*, sp. 26.

*Achatinella pulcherrima* Reeve, l. c. sp. 23, fig. *a* [nec Swainson].

*Achatinella tricolor* Smith, P. Zool. Soc. London, 1873, p. 70, pl. ix. fig. 6.

HAB. Oahu (various authors); Heia (Smith); Nuuanu and Mt. Tantalus (Perkins).

var. *crassidentata* Pfeiffer.

*Achatinella* (*Achatinellastrum*) *crassidentata* Pfeiffer, P. Zool. Soc. London, 1855, p. 6, pl. xxx. fig. 23.

*Achatinella diversa* Gulick, Ann. Lyc. New York, vi. p. 220, pl. vii. fig. 42 (1856, Dec.).

*Achatinella varia* Gulick, t. c. p. 222, pl. vii. fig. 43.

*Achatinella analoga* Gulick, t. c. p. 227, pl. vii. fig. 47.

HAB. Oahu, Halawa (Baldwin); Halawa, Palolo, Waialae and Wailupe (Gulick); Waialae and Nuuanu (Perkins).

var. *liliacea* Pfeiffer.

*Achatinella* (*Achatinellastrum*) *liliacea* Pfeiffer, P. Zool. Soc. London, 1859, p. 31.

HAB. Oahu (Baldwin).

The difficulty of arriving at a satisfactory dividing line between *A. vulpina* and *A. producta* is very great. As at present arranged, *A. vulpina* is the brown shell, var. *stewarti* the greenish coloured form, var. *crassidentata* the parti-coloured, and var. *liliacea* the bandless variety; all the above being sinistral. *A. producta* on the other hand is reserved for the larger and, usually, dextral form.

(106) *Achatinella* (*Achatinellastrum*) *wailuaensis*, sp. nov.

Testa dextrorsa, subperforata, nitida, turrita, solidula, levissime striata, alba, lineis castaneis picta, apud peripheriam zona alba, in sutura linea nigro-castanea notata; anfr. 5—5½, regulariter crescentes, convexi; apertura auriformis; margine columellari plica fusca mediocri munita, margine dextro acuto, callo parietali tenuissimo. Long. 15.5, alt. 8.4 mill. Plate XI. fig. 19.

A pretty little shell of the group of *A. bella* Reeve, of Molokai. A variety also occurred (Plate XI. fig. 20) in which the banding is almost obsolete, save in the suture of the earliest whorls and in one strong dark band below the periphery.

HAB. Maui, Wailua (Perkins).

(107) *Achatinella* (*Achatinellastrum*) *zonata* Gulick.

*Achatinella zonata* Gulick, Ann. Lyc. New York, VI. p. 237, pl. VIII. fig. 58.

*Achatinella glauca* Gulick, t. c. p. 232, pl. VIII. fig. 51.

United by Newcomb with *A. trilineata* Gulick; it appears however to have much flatter whorls, and I follow Mr Baldwin, with some little doubt, in restoring it to specific rank. According to Newcomb, *A. glauca* is a synonym of *A. livida* Swain., but specimens in the Brit. Mus. "named from Gulick's type" as a variety, lead me to place it here.

HAB. Oahu, Waimea, Pupukea, Waialei, Kahuku, Hauula, and Kaawa (Gulick); above Ewa (Perkins).

The following appears to be only a manuscript name:

*Achatinellastrum olesonii* Baldwin, Cat. Shells Hawaiian Islands, 1893, p. 5.

HAB. Oahu, Nuuanu.

#### PERDICELLA Pease.

*Perdicella* Pease, P. Zool. Soc. London, 1869, p. 649.

Pease, unfortunately, having named no type, it becomes necessary to select one and I propose to take *A. helena* Newc. The species come from Maui and Molokai.

(1) *Perdicella fulgurans*, sp. nov.

Testa subperforata, dextrorsa, ovato-turrita, nitida, sub lente lineis spiralibus confertim sculpta, albida, strigis fulgurantibus castaneis elegantissime picta, sutura modice impressa, apice obtusulo; anfr.  $5\frac{1}{2}$ , plano-convexi, ultimis  $\frac{2}{3}$  longitudinis testae aequans; apertura ovato-pyriformis, intus lilacina; peristoma margine dextro simplici, columellari subreflexo; plica columellaris torta, subprominens, mediocris, rapide ascendens. Long. 16; lat. 8; long. apert. 8.1; lat. apert. 4.9 mill. (Plate XI. fig. 5.)

This very pretty shell is akin to *P. zebrina* Pfr., but may be readily separated from it by its greater size, by being much broader in proportion to the length, and by the colour-pattern being finer in design and more zigzag. The protoconch is brown, then becoming paler with a dark shade near the sutural line. It is the *Partulina zebrina* Pfr. of Mr Baldwin's valuable catalogue.

HAB. E. Maui, Makawao to Huelo (Baldwin); Maui (Hutchison).

(2) *Perdicella helena* Newcomb.

*Achatinella helena* Newcomb, Ann. Lyc. New York, VI. (May, 1853), p. 27; P. Zool. Soc. London, 1853 [1854], p. 151, pl. xxiv. fig. 63.

HAB. Molokai, on Ti-tree (Newcomb); Kamalo to Kalae (Baldwin); Kalae and Makakupaia (Perkins).

(3) *Perdicella mauiensis* (Newcomb) Pfeiffer.

*Achatinella mauiensis* (sic, err. typ.) (Newcomb) Pfeiffer, P. Zool. Soc. London, 1855 [1856], p. 207; Newcomb, Amer. J. Conch. II. p. 217, pl. XIII. fig. 16.

HAB. Maui, Makawao to Huelo (Baldwin).

(4) *Perdicella minuscula* Pfeiffer.

*Achatinella* (*Newcombia*) *minuscula* Pfeiffer, P. Zool. Soc. London, 1858, p. 22.

HAB. Maui, Lahaina (Baldwin).—Molokai Mts. at 4000 feet (Perkins).

Both these habitats can hardly be correct; I suspect the former may be an error of identification.

(5) *Perdicella ornata* Newcomb.

*Achatinella ornata* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 149, pl. xxiv. fig. 55.

HAB. Maui; E. Maui (Newcomb); Lahaina (Baldwin).

(6) *Perdicella theodorei* Baldwin.

*Achatinella* (*Partulina*) *theodorei* Baldwin, P. Ac. Philad. 1895, p. 226, pl. x. fig. 27.

HAB. Molokai, Kawela (Baldwin); Makakupaia and the mountains (Perkins).

(7) *Perdicella zebra* Newcomb.

*Achatinella zebra* Newcomb, Ann. Lyc. New York, VI. p. 142 [Oct. 1855].

Placed by Dr Hartman, in his list, both in *Achatinellastrum* and *Laminella*!

HAB. E. Maui (Newcomb).



(8) *Perdicella zebrina* Pfeiffer.

*Newcombia zebrina* Pfeiffer, P. Zool. Soc. London, 1855 [1856], p. 202.

HAB. E. Maui (Baldwin as *P. zebra* Newc.).

## NEWCOMBIA Pfeiffer.

*Newcombia* Pfeiffer, Malak. Blätt. I. 1854, p. 117; Pease, P. Zool. Soc. London, 1869, p. 649.

Pfeiffer's list of species was very heterogeneous and included shells of diverse groups, his first species being *A. helena* Newcomb; fortunately Pease in 1869 properly confined the group to the shells it is now used for.

Two sections may be formed: I. Spirally lirata; *N. lirata*, etc. II. Nearly smooth, usually more elongate; *N. cumingi*, etc.

(1) *Newcombia canaliculata* Baldwin.

*Achatinella* (*Newcombia*) *canaliculata* Baldwin, P. Ac. Philad. 1895, p. 226, pl. x. figs. 28, 29; Gwatkin, t. c. p. 238 [radula].

HAB. Molokai, Halawa (Baldwin).

(2) *Newcombia cinnamomea* Pfeiffer.

*Achatinella cinnamomea* Pfeiffer, Malak. Blätt. IV. 1857, p. 230.

*Achatinella* (*Newcombia*) *cinnamomea* Pfeiffer, P. Zool. Soc. London, 1858, p. 22.

*Newcombia cinnamomea* Pfeiffer, Gwatkin, P. Ac. Philad. 1895, p. 238 [radula].

Conchologically this is very close to *N. cumingi* Newc.

HAB. Molokai, Mapulehu (Baldwin); Makakupaia and the mountains (Perkins).

(3) *Newcombia cumingi* Newcomb.

*Achatinella cumingi* Newcomb, Ann. Lyc. New York, VI. 1853, p. 25; P. Zool. Soc. London, 1853 [1854], pl. XXIV. fig. 59.

HAB. Maui, Haleakala (Newcomb); Lahaina and Makawao (Baldwin).

(4) *Newcombia gemma* Pfeiffer.

*Achatinella gemma* Pfeiffer, Malak. Blätt. IV. 1857, p. 323.

*Achatinella* (*Newcombia*) *gemma* Pfeiffer, P. Zool. Soc. London, 1858, p. 22.

Akin to *N. lirata* Pfr., but the sculpture is almost obsolete.

HAB. Molokai Mts. (Perkins).

(5) *Newcombia plicata* (Mighels MS.) Pfeiffer.

*Achatinella plicata* Pfeiffer, Mon. Helic. Viv. II. 1848, p. 235; Newcomb, Ann. Lyc. New York, VI. 1858, p. 312 [animal]; Reeve, Conch. Icon. *Achatinella*, sp. 44.

*Bulimus liratus* Pfeiffer, P. Zool. Soc. London, 1851 [1853], p. 261.

I cannot trace the supposed description by Mighels in P. Boston Soc. as *Bulimus plicatus*.

HAB. Molokai, Kalae (Baldwin); Mountains (Perkins).

(6) *Newcombia perkinsi* Sykes.

*Newcombia perkinsi* Sykes, P. Malac. Soc. London, II. 1896, p. 130.  
(Plate XI. fig. 36.)

HAB. Molokai Mts. (Perkins). A fine series of this handsome shell.

(7) *Newcombia pfeifferi* Newcomb.

*Achatinella pfeifferi* Newcomb, Ann. Lyc. New York, VI. p. 25 (May, 1853);  
P. Zool. Soc. London, 1853 [1854], p. 150, pl. XXIV. fig. 58.

*Bulimus newcombianus* Pfeiffer, P. Zool. Soc. London, 1851, p. 261 [Dec. 1853].

HAB. Molokai, Kaluaaha (Baldwin).

(8) *Newcombia philippiana* Pfeiffer.

*Achatinella philippiana* Pfeiffer, Malak. Blätt. IV. 1857, p. 89.

HAB. Molokai, Makakupaia (Baldwin).

(9) *Newcombia sulcata* Pfeiffer.

*Achatinella sulcata* Pfeiffer, Malak. Blätt. IV. 1857, p. 231.

*Achatinella* (*Newcombia*) *sulcata* Pfeiffer, P. Zool. Soc. London, 1858, p. 22.

*Newcombia sulcata* Pfeiffer, Gwatkin, P. Ac. Philad. 1895, p. 238 [radula].

HAB. Molokai, Pohakupili (Baldwin).

## AMASTRA H. and A. Adams.

*Amastra* H. and A. Adams, Genera of Recent Mollusca, II. p. 137.

Type: the group of *A. magna* Ad.

This large genus may for convenience be subdivided into groups somewhat in the following manner; perhaps the large first section might be more broken up, though I think no sectional name will prove necessary.

subgen. AMASTRA (s. str.).

(1) *Amastra affinis* Newcomb.

*Achatinella affinis* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 142, pl. XXIII. fig. 35.

*Achatinella* (*Laminella*) *goniostoma* Pfeiffer, P. Zool. Soc. London, 1855, p. 203.

*Amastra rustica* Gulick, P. Zool. Soc. London, 1873, p. 84, pl. x. fig. 17.

Dr Hartman has suggested that *A. rustica* may equal *A. variegata* Pfr., an Oahu species.

HAB. E. Maui, Kula (Newcomb, Gulick).

(2) *Amastra albolabris* Newcomb.

*Achatinella albolabris* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 149, pl. XXIV. fig. 56.

*Achatinella nucleola* Reeve, Conch. Icon. *Achatinella*, sp. 39 [non Gould].

One young specimen I refer to this species. See a note under *A. subrostrata* Pfr.

HAB. Oahu, Waianae Mts. (Newcomb, Perkins); Kapalama and Kalihi (Baldwin).

(3) *Amastra amicta* Smith.

*Amastra amicta* Smith, P. Zool. Soc. London, 1873, p. 86, pl. x. fig. 20.

Dr Hartman notes that this species "may equal *petricola*"; it appears to me quite distinct.

HAB. Hawaiian Islands (Smith).



(4) *Amastra assimilis* Newcomb.

*Achatinella assimilis* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 148, pl. XXIII. fig. 53.

*Amastra assimilis* Newcomb, Gwatkin, P. Ac. Philad. 1895, p. 238 [radula].

*Achatinella deshayesii* Morelet, Bull. Soc. Hist. Nat. Moselle, 1857, p. 27 [pars].

It has been suggested that this is a variety of *A. nubilosa* Mighels, but the present species is a more slender shell with much flatter whorls.

HAB. W. Maui (Newcomb).

(5) *Amastra aurostoma* Baldwin.

*Amastra aurostoma* Baldwin, Nautilus, x. (July, 1896), p. 31.

HAB. Lanai (Baldwin).

(6) *Amastra badia* Baldwin.

*Amastra badia* Baldwin, P. Ac. Philad. 1895, p. 230, pl. XI. fig. 40.

HAB. Oahu, Ewa (Baldwin).

(7) *Amastra biplicata* Newcomb.

*Achatinella biplicata* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 156, pl. XXIV. fig. 75.

*Achatinella deshayesii* Morelet, Bull. Soc. Hist. Nat. Moselle, 1857, p. 27 [pars]; Pease, P. Zool. Soc. London, 1869, p. 652.

Morelet's original series, now in the British Museum, consists of three specimens, one belonging to this species, and two to *A. assimilis* Newc.; his diagnosis however refers to a form with only one columellar plait. From Mr Perkins' long series, it appears that the upper plait is variable and sometimes becomes obsolete; in one specimen, which has received an injury, both plaits are dwarfed so as to show only as a slight thickening of the columella.

HAB. Lanai (Newcomb); Waiapaa and Koele (Perkins).

(8) *Amastra breviata* Baldwin.

*Amastra breviata* Baldwin, P. Ac. Philad. 1895, p. 231, pl. XI. figs. 45, 46.

HAB. Oahu, Palolo and Halawa (Baldwin).

(9) *Amastra citrea* Sykes.

*Amastra citrea* Sykes, P. Malac. Soc. London, II. (1896), p. 129.

Plate XI. fig. 4.

HAB. Molokai (Hutchison).

(10) *Amastra conicospira* Smith.

*Amastra conicospira* Smith, P. Zool. Soc. London, 1873, p. 86, pl. x. fig. 10.

Dr Hartman places this in the synonymy of *A. assimilis* Newc.; I have never seen the present species, but from the figure it appears distinct.

HAB. Hawaiian Islands (Smith).

(11) *Amastra conifera* Smith.

*Amastra conifera* Smith, P. Zool. Soc. London, 1873, p. 85, pl. x. fig. 11.

HAB. E. Maui, Kula (Smith).

(12) *Amastra cornea* Newcomb.

*Achatinella cornea* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 141, pl. xxiii. fig. 32.

HAB. Oahu, below Kaala (Perkins).

Newcomb appears not to have noted the exact habitat; the type-tablet in the British Museum is, however, labelled 'Oahu.'

(13) *Amastra crassilabrum* Newcomb.

*Achatinella crassilabrum* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 141, pl. xxiii. fig. 31.

HAB. Oahu, Waianae (Newcomb, &c.).

(14) *Amastra cylindrica* Newcomb.

*Achatinella cylindrica* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 134, pl. xxii. fig. 11; Ann. Lyc. New York, vi. p. 325 [animal].

HAB. Oahu, Waianae (Newcomb).

(15) *Amastra decorticata* Gulick.

*Amastra decorticata* Gulick, P. Zool. Soc. London, 1873, p. 84, pl. x. fig. 14.

Dr Hartman has united this with *A. ellipsoidea* of Gould, from Maui, but a glance at Gould's figures would have shewn him their distinctness.

HAB. Oahu, Kawaihoa, Halemano, and various localities (Gulick); ridges of Nuuanu (Perkins).

(16) *Amastra durandi* Ancey.

*Amastra durandi* Ancey, Naturaliste, 1897, p. 178.

HAB. Oahu (Ancey).

(17) *Amastra ellipsoidea* Gould.

*Achatinella ellipsoidea* Gould, P. Boston Soc. II. (1847), p. 200; U. S. Explor. Exped. Moll. pl. VII. fig. 96.

A species unknown to me: Newcomb united it with his *A. pupoidea*, but it appears not to be so produced in form.

HAB. Maui (Gould).

(18) *Amastra elliptica* Gulick.

*Amastra elliptica* Gulick, P. Zool. Soc. London, 1873, p. 83, pl. x. fig. 15.

HAB. Oahu, Waialei, Kahuku, Hauula, Kawaihoa (Gulick); Waianae (Hartman).

Two specimens, collected by Mr Perkins on "Waianae Mts. Oahu," may belong to a large, incrassate variety.

(19) *Amastra extincta* Pfeiffer.

*Achatinella (Laminella) extincta* Pfeiffer, P. Zool. Soc. London, 1855 [1856], p. 204.

? ? *Leptachatina hartmani* (Newc. MS.) Hartman, P. Ac. Philad. 1888, p. 54.

I fancy that the new name given by Dr Hartman, on the ground that recent examples had been found, was due to an error of identification. Specimens submitted to me under the name of *A. extincta* by Mr Baldwin appear to be only a form of *A. similaris* Pease.

HAB. Oahu, subfossil (Pfeiffer).



(20) *Amastra flavescens* Newc.

*Achatinella flavescens* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 151, pl. XXIV. fig. 62.

HAB. Hawaii (Newcomb).

Dr Hartman gives also "Wanoa, Oahu (Newcomb)," but this must be an error.

(21) *Amastra frosti* Ancey.

*Amastra frosti* Ancey, Mem. Soc. Zool. France, v. (1892), p. 719; Sykes, P. Malac. Soc. London, III. pl. XIII. fig. 12.

Mons. Ancey has also described (P. Malac. Soc. London, III. p. 269, pl. XII. fig. 11) a variety *unicolor*.

HAB. Oahu, Waianae (Ancey).

(22) *Amastra grayana* Pfeiffer.

*Achatinella (Laminella) grayana* Pfeiffer, P. Zool. Soc. London, 1855 [1856, Feb.], p. 204.

A single specimen. Dr Hartman has suggested that this is a form of *A. magna*, but I have not seen linking specimens. It is marked with spiral bands, due probably to the periostracum.

HAB. Oahu (Clessin, Nomencl. Helic. Viv. 1881); ? Oahu (Baldwin).—Lanai, Lanaihale, a ground shell (Perkins).

(23) *Amastra humilis* Newcomb.

*Achatinella humilis* Newcomb, Ann. Lyc. New York, VI. (Oct. 1855), p. 143; Amer. J. Conch. II. (1866), p. 211, pl. XIII. fig. 4.

HAB. Molokai, Kalae (Newcomb); Makakupaia and the mountains (Perkins).

(24) *Amastra inflata* Pfeiffer.

*Achatinella (Laminella) inflata* Pfeiffer, P. Zool. Soc. London, 1855 [Feb. 1856] p. 203.

HAB. Oahu (Clessin, Nomencl. Helic. Viv.); Koolauloa (Baldwin).

(25) *Amastra intermedia* Newcomb.

*Achatinella intermedia* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 135, pl. XXII. fig. 13.

HAB. Oahu, Waianae (Newcomb); ridges of Nuuanu, and Waianae Mts. below Kaala (Perkins).

A long series.

(26) *Amastra irregularis* Pfeiffer.

*Achatinella irregularis* Pfeiffer, P. Zool. Soc. London, 1855 [Feb. 1856], p. 205.

HAB. Hawaiian Islands (Pfeiffer).

(27) *Amastra lincolata* Newcomb.

*Achatinella lineolata* Newcomb, Ann. Lyc. New York, VI. (1853), p. 29; P. Zool. Soc. London, 1853 [1854], p. 140, pl. XXIII. fig. 29.

HAB. Hawaii (Newcomb).

The habitat 'Maui,' originally given, seems to have been a slip.

(28) *Amastra longa* Sykes.

*Amastra longa* Sykes, P. Malac. Soc. London, II. (Oct. 1896), p. 129. Plate XI. fig. 35.

HAB. Lanai (Newcomb); windward side, apparently extinct (Perkins).

(29) *Amastra luctuosa* Pfeiffer.

*Achatinella (Laminella) luctuosa* Pfeiffer, P. Zool. Soc. London, 1855 [Feb. 1856], p. 204.

*Laminella luctuosa* Pfeiffer, Bland and Binney, Ann. Lyc. New York, x. pp. 335—6 [jaw and radula].

HAB. Oahu, Waialeale (Baldwin).

(30) *Amastra magna* C. B. Adams.

*Achatinella magna* C. B. Adams, Contrib. to Conch. p. 125, 1850; Newcomb, Ann. Lyc. New York, vi. (1858), p. 319 [animal].

*Achatinella baldwinii* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 155, pl. xxiv. fig. 72.

I have seen a good series of this handsome shell.

HAB. Lanai (Newcomb); behind Koele (Perkins).

(31) *Amastra malleata* Smith.

*Amastra malleata* Smith, P. Zool. Soc. London, 1873, p. 85, pl. x. fig. 18.

Mr Baldwin has united this with *A. affinis* Newcomb; I have not seen a specimen, but, from the figure and description, they appear distinct.

HAB. E. Maui, Kula (Smith).

(32) *Amastra mastersi* Newcomb.

*Achatinella mastersi* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 153, pl. xxiv. fig. 67; Ann. Lyc. New York, vi. p. 332 [animal].

*Laminella mastersi* Newcomb, Bland and Binney, Ann. Lyc. New York, x. p. 335, pl. xv. figs. 7, 9—11 [jaw and radula].

*Amastra mastersi* Newcomb, Gwatkin, P. Ac. Philad. 1895, p. 239 [radula].

*Achatinella rubens* Pfeiffer, Malak. Blätt. 1854, p. 129 [nec Gould, fide Newcomb].

HAB. Maui (Newcomb); ? Haleakala at 5000 feet (Perkins).

Two, apparently immature, specimens, which I refer here with some hesitation. Four specimens from "Molokai Mts." appear to me to be very close to this species.

(33) *Amastra melanosia* Newcomb.

*Achatinella melanosia* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 144, pl. xxiii. fig. 41.

HAB. Hawaii (Newcomb).

(34) *Amastra modesta* C. B. Adams.

*Achatinella modesta* C. B. Adams, Contrib. to Conch. 1850, p. 128.

*Achatinella pumila* Gulick, Clessin, Nom. Helic. Viv. 1881, p. 313.

HAB. Hawaiian Islands (Adams).—Molokai (Hartman, Baldwin).



(35) *Amastra moesta* Newcomb.

*Achatinella moesta* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 157, pl. xxiv. fig. 77.

*Achatinella obscura* Newcomb, t. c. p. 157, pl. xxiv. fig. 78.

According to Pease (P. Zool. Soc. London, 1869, p. 651), and he is followed by Dr Hartman (P. Ac. Philad. 1888, p. 47), these two forms are one species. Probably this is correct.

HAB. Lanai (Newcomb).

(36) *Amastra mucronata* Newcomb.

*Achatinella mucronata* Newcomb, Ann. Lyc. New York, vi. (May 1853), p. 28 ; P. Zool. Soc. London, 1853 [1854], p. 146, pl. xxiii. fig. 49.

*Achatinella* (*Laminella*) *fusiformis* Pfeiffer, P. Zool. Soc. London, 1855, p. 5, pl. xxx. fig. 18.

HAB. Molokai (Newcomb, Baldwin).

Newcomb, in his later paper, gave the locality of 'Maui,' but probably this is a slip due to the fact that he was, as he subsequently stated, unable to see the proofs. Two specimens, collected on Molokai by Mr Perkins, appear to belong to a dwarf race.

(37) *Amastra nana* Baldwin.

*Amastra nana* Baldwin, P. Ac. Philad. 1895, p. 232, pl. xi. figs. 48, 49 [with animal]; Gwatkin, t. c. p. 239 [radula].

HAB. Maui, Makawao at 4000 feet (Baldwin).

(38) *Amastra nigra* Newcomb.

*Achatinella nigra* Newcomb, P. Boston Soc. v. (Sept. 1855), p. 219 ; Amer. J. Conch. ii. (1866), p. 210, pl. xiii. fig. 3.

According to Clessin (Nomencl. Helic. Viv. 1881, p. 311) *A. globosa*, Gulick nec Pfeiffer, is a synonym.

HAB. E. Maui (Newcomb).

(39) *Amastra nubilosa* Mighels.

*Achatinella nubilosa* Mighels, P. Boston Soc. II. (1845), p. 20; Reeve, Conch. Icon. *Achatinella*, sp. 1; Newcomb, Ann. Lyc. New York, VI. p. 312 [animal].

*Achatinella nubilosa* Gould, U.S. Explor. Exped. Moll. pl. VII. fig. 95.

HAB. Molokai (Newcomb); Kalae (Baldwin).

It has been suggested, but I think erroneously, that this species comes, in reality, from Oahu.

(40) *Amastra nucula* Smith.

*Amastra nucula* Smith, P. Zool. Soc. London, 1873, p. 85, pl. x. fig. 19.

HAB. Lanai ? (Smith).

(41) *Amastra peasei* Smith.

*Amastra peasei* Smith, P. Zool. Soc. London, 1873, p. 86, pl. x. fig. 13.

HAB. Hawaiian Islands (Smith).—Oahu ? (Baldwin).

(42) *Amastra pellucida* Baldwin.

*Amastra pellucida* Baldwin, P. Ac. Philad. 1895, p. 231, pl. XI. figs. 41, 42 [with animal].

HAB. Oahu, Waianae Valley (Baldwin).

(43) *Amastra petricola* Newcomb.

*Achatinella petricola* Newcomb, Ann. Lyc. New York, VI. (Oct. 1855), p. 143; Amer. J. Conch. II. (1866), p. 211, pl. XIII. fig. 6.

*Achatinella* (*Laminella*) *umbilicata* Pfeiffer, P. Zool. Soc. London, 1855 [Feb. 1856], p. 205.

*Amastra umbilicata* Pfr., Hartman, P. Ac. Philad. 1888, p. 50, pl. I. fig. 11.

HAB. Molokai (Newcomb); Mapulehu (Baldwin).

(44) *Amastra porphyria* Newcomb.

*Achatinella porphyria* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 136, pl. XXII. fig. 16.

*Achatinella* (*Laminella*) *grossa* Pfeiffer, P. Zool. Soc. London, 1855 [Feb. 1856], p. 204.

HAB. Oahu, Waianae (Newcomb).

(45) *Amastra porphyrostoma* Pease.

*Amastra porphyrostoma* Pease, J. Conchyl. xvii. (1869), p. 172; Hartman, P. Ac. Philad. 1888, p. 48, pl. i. fig. 6.

HAB. Oahu (Pease).

(46) *Amastra pullata* Baldwin.

*Amastra pullata* Baldwin, P. Ac. Philad. 1895, p. 228, pl. xi. figs. 31, 32; Gwatkin, t. c. p. 239 [radula].

*Amastra umbrosa* Baldwin, t. c. p. 229, pl. xi. figs. 36, 37; Gwatkin, t. c. p. 239 [radula].

After an examination of the long series collected by Mr Perkins I have been unable to sever these two species. The animals are said to differ in colour, and they are said to inhabit different districts; conchologically they seem to shade into one another, and the radula appears to be identical. Probably they will prove to be local races.

HAB. Molokai, Kamalo (Baldwin, as *A. umbrosa*); Waikolu (Baldwin, as *A. pullata*); Kamalo and Makakupaia Mts. (Perkins).

(47) *Amastra pupoidea* Newcomb.

*Achatinella pupoidea* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 144, pl. xxiii. fig. 42.

The colouring is somewhat exaggerated in the figure. See also a note under *A. ellipsoidea* Gould.

HAB. E. Maui (Newcomb).

(48) *Amastra pusilla* Newcomb.

*Achatinella pusilla* Newcomb, Ann. Lyc. New York, vi. (Oct. 1855), p. 144; Amer. J. Conch. ii. (1866), p. 211, pl. xiii. fig. 5.

*Achatinella pulla* (Newcomb) Pfeiffer, P. Zool. Soc. London, 1855 [Feb. 1856], p. 209.

HAB. Lanai (Newcomb).



(49) *Amastra reticulata* Newcomb.

*Achatinella reticulata* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 148, pl. xxiv. fig. 54.

*Achatinellastrum conspersa* Pfeiffer, P. Zool. Soc. London, 1855 [March], p. 7, pl. xxx. fig. 26.

HAB. Oahu, Waianae (Newcomb).

(50) *Amastra rubens* Gould.

*Achatinella rubens* Gould, P. Boston Soc. II. (1845), p. 27; Newcomb, Ann. Lyc. New York, VI. p. 314 [animal]; Reeve, Conch. Icon. *Achatinella*, sp. 42, pars b [fide Newcomb].

HAB. Oahu, W. Mts. (Newcomb); Kaala (Baldwin).

(51) *Amastra rubicunda* Baldwin.

*Amastra rubicunda* Baldwin, P. Ac. Philad. 1895, p. 229, pl. xi. fig. 38 [with animal]; Suter, t. c. p. 240, pl. xi. figs. 54 [jaw], 56 [radula].

HAB. Oahu, Konahuanui Mt. (Baldwin).

(52) *Amastra rubida* Gulick.

*Amastra rubida* Gulick, P. Zool. Soc. London, 1873, p. 84, pl. x. fig. 12.

HAB. Oahu, Kahuku (Gulick).

(53) *Amastra sericea* Pfeiffer.

*Achatinella (Laminella) sericea* Pfeiffer, P. Zool. Soc. London, 1859, p. 31.

HAB. Hawaiian Isles (Pfeiffer).—? Oahu, Waialua (Baldwin). Unknown to me.

(54) *Amastra simularis* Hartman.

*Amastra simularis* Hartman, P. Ac. Philad. 1888, p. 252, pl. xiii. fig. 7.

*Amastra simularis* Hartman, Gwatkin, op. cit. 1895, p. 239 [radula].

HAB. Molokai (Hartman, Perkins); Mapulehu (Baldwin).

var. *roseotincta* Sykes.

*A. similaris* Hartman, var. *roseotincta* Sykes, P. Malac. Soc. London, II. p. 130.

Plate XI. fig. 3.

HAB. Molokai mountains (Perkins).

Varieties under the names of *maura* and *semicarnea* have recently been described by Mons. Ancey (P. Malac. Soc. London, III. p. 270, pl. XIII. figs. 8, 16).

(55) *Amastra solida* Pease.

*Amastra solida* Pease, J. Conchyl. XVII. (1869), p. 173.

HAB. Oahu (Pease).

(56) *Amastra spirizona* Férussac.

*Helix* (*Cochlogena*) *spirizona* Férussac, Prodrôme, no. 433.

*Achatina spirizona* Fér., Hist. Moll. II. pt. 2, p. 196, pl. CLV. figs. 14, 15.

*Achatinella spirizona* Fér., Newcomb, Ann. Lyc. New York, VI. p. 307 [animal].

*Achatinella acuta* Swainson, Quart. J. Sci. Lit. Arts, I. (1828), p. 84; Zool.

Illustr., ser. 2, pl. XCIX. fig. 3.

*Achatinella batika* Mighels, MS.

HAB. Oahu, Waianae Mts. (Baldwin); Waianae Mts. below Kaala on lee side, and Halemano (Perkins).

var. *nigrolabris* Smith.

*Amastra nigrolabris* Smith, P. Zool. Soc. London, 1873, p. 85, pl. x. fig. 9.

HAB. Oahu, Wahiawa, Kalaikoa, Waimea (Smith); Halemano (Perkins).

var. *rudis* Pfeiffer.

*Achatinella rudis* Pfeiffer, P. Zool. Soc. London, 1855, p. 5 (pars).

*Laminella albida* Pfeiffer, t. c. p. 203.

*Newcombia chlorotica* Pfeiffer, t. c. p. 203.

HAB. Oahu.

*A. nigrolabris* Smith, is, in my opinion, only a broader variety, in which the light band below the suture is wider: in a box of specimens from Halemano forms are found showing a graduation from it to the typical form. It is possible that *A. rudis* may be a distinct species, but I fancy it is only a paler colour variety. Mr Perkins notes that he found the species "mostly on dead branches of trees, covering itself with mucus to which débris of bark and wood stick, and therefore very well concealed."

(57) *Amastra subrostrata* Pfeiffer.

*Achatinella* (*Laminella*) *subrostrata* Pfeiffer, P. Zool. Soc. London, 1859, p. 31.

HAB. Hawaiian Islands (Pfeiffer).—? Oahu (Baldwin).

Dr Hartman suggests that this is the same as *A. albolabris* Newc. ; it may possibly be an elongate variety, but I doubt it.

(58) *Amastra tenuilabris* Gulick.

*Amastra tenuilabris* Gulick, P. Zool. Soc. London, 1873, p. 83, pl. x. fig. 16.

HAB. Oahu (Gulick, with some doubt).

Dr Hartman remarks that from "a comparison of types" this is a synonym of *A. flavescens* Newc. I have, equally, examined the types, and this species differs in being stumpier, with a larger mouth, and more shouldered whorls.

(59) *Amastra tenuispira* Baldwin.

*Amastra tenuispira* Baldwin, P. Ac. Philad. 1895, p. 232, pl. XI. fig. 51.

HAB. Oahu, Kaala Mt. (Baldwin).

(60) *Amastra textilis* Férussac.

*Helix* (*Helicteres*) *textilis* Férussac, Voy. Freycinet, Zool., p. 482.

*Achatinella textilis* Férussac, Binney, Ann. Lyc. New York, XI. p. 190, pl. XIV. fig. G [radula].

*Amastra textilis* Férussac, Hartman, P. Ac. Philad. 1888, p. 50, pl. I. fig. 8.

*Achatinella microstoma* Gould, P. Boston Soc. II. (1845), p. 28.

*Achatinella ventulus* Férussac, Reeve, Conch. Icon. *Achatinella*, sp. 31; Pfeiffer in Conch.-Cab. *Achatinella*, p. 287, pl. LXVII. figs. 12, 13 [nec Férussac].

HAB. Oahu (Baldwin, Hutchison, &c.).

A single specimen from Nuuanu, Oahu, appears to be a varietal form.

(61) *Amastra transversalis* Pfeiffer.

*Achatinella* (*Laminella*) *transversalis* Pfeiffer, P. Zool. Soc. London, 1855 [Feb. 1856], p. 204.

United by Newcomb with *A. reticulata*, but appears distinct.

HAB. Oahu, Keawaawa (Baldwin).

(62) *Amastra tristis* Férussac.

*Helix* (*Helicteres*) *tristis* Férussac, Voy. Freycinet, Zool. p. 482, pl. LXVIII. figs. 6, 7.

*Achatinella tristis* Férussac, Reeve, Conch. Icon. *Achatinella*, sp. 37; Pfeiffer in Conch.-Cab. *Achatinella*, pl. LXVII. figs. 10—11 [not good].

*Achatinella fuliginosa* Gould, P. Boston Soc. II. (1845), p. 28.

HAB. Oahu, Palolo (Hartman); Nuuanu to Palolo (Baldwin).

(63) *Amastra turritella* Férussac.

*Helix* (*Cochlogena*) *turritella* Férussac, Prodrome, No. 434; Voy. Freycinet, Zool. p. 481.

*Achatina turritella* Fér., Hist. Moll. II. pt. 2, p. 196, pl. CLV. fig. 13; Souleyet, Voy. Bonite, Zool. II. p. 509, pl. XXIX. figs. 7—8 [animal].

*Achatinella turritella* Fér., Newcomb, Ann. Lyc. New York, VI. p. 307 [animal].

? *Helix* (*Cochlogena*) *lutcola* Férussac, Voy. Freycinet, Zool. p. 480.

? *Achatina lutcola* Fér., Hist. Moll. II. pt. 2, p. 196, pl. CLV. fig. 12.

? *Laminella lutcola* Fér. (sic), Hartman, P. Ac. Philad. 1888, p. 42.

*Achatina oahuensis* Green, Contrib. Macl. Lyc. Phil. I. (1827), p. 49, pl. IV. fig. 5.

*Achatinella inornata* Mighels, P. Boston Soc. II. (1845), p. 21.

Newcomb states that he was unable to trace the type of *A. lutcola*, and apparently it is lost: Pease (P. Zool. Soc. London, 1869, p. 652) united it with *A. turritella*, and probably this will prove to be correct.

HAB. Oahu (authors); Kalihi to Palolo (Baldwin); ridges of Nuuanu Valley (Perkins).

(64) *Amastra undata* Baldwin.

*Amastra undata* Baldwin, P. Ac. Philad. 1895, p. 230, pl. XI. fig. 39.

HAB. Oahu, Nuuanu (Baldwin).

(65) *Amastra uniplicata* Hartman.

*Amastra uniplicata* Hartman, P. Ac. Philad. 1888, p. 50, pl. I. fig. 7.

HAB. Molokai (Hartman).



(66) *Amastra variegata* Pfeiffer.

*Achatinella variegata* Pfeiffer, Zeitschr. für Malak. 1849, p. 90; Conch.-Cab.

*Achatinella*, p. 282, pl. LXVII. figs. 14, 15.

*Amastra rubens*, Reeve, pars, Conch. Icon. *Achatinella*, fig. 42 a [fide Newcomb].

*Achatinella decepta* C. B. Adams, Contrib. to Conch. 1850, p. 127.

HAB. Oahu, head of Boothes Valley (Hartman); Waianae (Baldwin).

(67) *Amastra ventulus* Férussac.

*Helix (Helicteres) ventulus* Férussac, Voy. Freycinet, Zool. p. 481.

*Achatinella ventulus* Férussac, Newcomb, Ann. Lyc. New York, vi. p. 306 [animal].

*Achatinella melampoides* Pfeiffer, P. Zool. Soc. London, 1851 [Dec. 1853], p. 262 ;

Pfeiffer in Conch.-Cab. *Achatinella*, p. 288, pl. LXVII. figs. 8, 9.

*Achatinella (Amastra) manoaensis* Newc., Clessin, Nom. Helic. Viv. 1881, p. 311.

May prove to be a *Leptachatina*.

HAB. Oahu, Nuuanu to Palolo (Baldwin); Panoa Valley and ridges of Nuuanu (Perkins).

(68) *Amastra violacea* Newcomb.

*Achatinella violacea* Newcomb, Ann. Lyc. New York, vi. (1853, May), p. 18 ;

P. Zool. Soc. London, 1853 [1854], p. 135, pl. XXII. fig. 14.

*Achatinella gigantea* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 136, pl. XXII. fig. 17.

These two species have been united by Pease and Dr Hartman, the latter remarking "The only example of *gigantea* ever found is in the British Museum. It probably equals a large example of *A. violacea*, Newc." Probably the locality of Maui, given by Newcomb, was an error, as his specimen appears to be only an elongate form of the Molokai shell. This varies very much in size and shape, as may be seen from the following :

Alt. 34 ; diam. 16 ; alt. ap. 15 ; lat. ap. 9.5 mill.

" 31 ; " 12 ; " " 11.5 ; " " 7 "

" 31 ; " 15 ; " " 13 ; " " 9 "

Mr Baldwin has left *A. gigantea* in his list as a Maui shell, but the fact that this diligent collector has marked it as a shell unknown to him, lends confirmation to the view that it does not really come from that island.

HAB. Molokai, Haleakala (Newcomb) ; Mapulehu to Halawa (Baldwin) ; Halawa and Pelekunu (Perkins).—? Maui as *A. gigantea*, Haleakala (Newcomb).

subgenus LAMINELLA Pfeiffer.

*Laminella* Pfr., Malak. Blätt. I. 1854, p. 126.

Pfeiffer's original group was very heterogeneous, as was that of Pease under this name (P. Zool. Soc. London, 1869, p. 648); the latter author also proposing *Perdicella* for a portion of the group. I would propose to select *A. gravis* Fér., the old and well-known species, as the type.

(69) *Amastra (Laminella) alexandri* Newcomb.

*Achatinella alexandri* Newcomb, P. Calif. Ac. III. (1865), p. 182; Amer. J. Conch., II. (1866), p. 216, pl. XIII. fig. 14.

HAB. West Maui, at 7500 feet (Newcomb); top of West Maui (Baldwin).

(70) *Amastra (Laminella) citrina* (Mighels MS.) Pfeiffer.

*Achatinella citrina* Mighels, Pfeiffer, Mon. Helic. Viv. II. (1848), p. 234; Reeve, Conch. Icon. *Achatinella*, sp. 33; Newcomb, Ann. Lyc. New York, VI. p. 312 [animal].

Pease united (P. Zool. Soc. London, 1869, p. 652) this species with *A. venusta*. Conchologically, they differ in the periostracum, shape of whorls, &c., while, from the descriptions given by Newcomb, the animals are distinct in colouration.

HAB. Molokai, Kalae to Waikolu (Baldwin); Molokai (Perkins).

(71) *Amastra (Laminella) concinna* Newcomb.

*Achatinella concinna* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 157, pl. XXIV. fig. 79.

Newcomb's type was a bandless dextral shell. In the very fine series collected, both dextral and sinistral forms occur; black bands are either absent or present, and, in the latter event, vary from one to even four in number.

HAB. Lanai (Newcomb, &c.); Koele side of highest point, side of highest point furthest from Koele, near Koele at 3000 feet (Perkins).

(72) *Amastra (Laminella) depicta* Baldwin.

*Laminella depicta* Baldwin, P. Ac. Philad. 1895, p. 228, pl. XI. figs. 33—5 [animal described].

A very fine series, shewing a range of colour from pale yellow to rich orange, tinged with crimson; it is sometimes dextral, but sinistral forms predominate.

HAB. Molokai, Kamalo (Baldwin); mountains, and above Pelekunu (Perkins).

(73) *Amastra (Laminella) elongata* Newcomb.

*Achatinella elongata* Newcomb, Ann. Lyc. New York, VI. (May, 1853), p. 26.

*Achatinella acuta* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 142 [nec Swainson].

The figure given in P. Zool. Soc. London (l. c.) under this name does not (fide Newcomb) represent the present species, but *A. soror*. Dr Hartman gives 'Makawao, Maui' as the habitat, but this must be an error; further he unites the species, erroneously in my opinion, with *A. hutchinsonii* Pease.

HAB. Oahu, Lehue (Newcomb); Waianae Mts (Baldwin).

(74) *Amastra (Laminella) erecta* Pease.

*Laminella erecta* Pease, J. Conchyl., XVII. (1869), p. 174.

Close to *A. micans* Pfeiffer.

HAB. Maui (Pease).

(75) *Amastra (Laminella) farcimen* Pfeiffer.

*Achatinella (Laminella) farcimen* Pfeiffer, P. Zool. Soc. London, 1856, p. 334. nec *Amastra farcimen*, Pfeiffer, Hartman, P. Ac. Philad. 1888, p. 46, pl. 1. fig. 5.

Dr Hartman states that his figure is "typical"; this is obviously incorrect as the type is a sinistral specimen, of considerable size, while the figure represents a smaller, dextral, shell of another group. What species his shell may belong to, I am unable to determine, but it appears to possess no columellar plait.

HAB. Maui (Newcomb, fide Pfeiffer).

(76) *Amastra (Laminella) fraterna* Sykes.

*Amastra fraterna*, Sykes, P. Malac. Soc. London, II. (Oct. 1896), p. 129.

Plate XI. fig. 23.

HAB. Lanai, mountains behind Koele (Perkins).

(77) *Amastra (Laminella) grvida* Férussac.

*Helix grvida* Férussac, Voy. Freycinet, Zool. p. 478, pl. LXVIII. figs. 4, 5.

*Achatina grvida* Férussac, Deshayes, Hist. Moll. II. p. 192, pl. CLV. figs. 3, 4.

*Achatinella grvida* Fér., Newcomb, Ann. Lyc. New York, VI. p. 307 [animal].

*Achatinella suffusa* Reeve, Conch. Icon. *Achatinella*, sp. 11.

*Achatinella dimondi* C. B. Adams, Contrib. to Conch. 1850, p. 126 (with var. *lata*).

The specimen described by Reeve does not now appear to exist in the Brit. Mus. collection.

HAB. Oahu, Kalihi to Niu (Baldwin); Nuuanu (Perkins).

(78) *Amastra* (*Laminella*) *helvina* Baldwin.

*Achatinella* (*Laminella*) *helvina* Baldwin, P. Ac. Philad. 1895, p. 227, pl. xi. fig. 30 [shell, animal, and anatomy]; Gwatkin, t. c. p. 239 [radula].

Some specimens, given to Mr Perkins by Mr O. Meyer, are broader and have more periostracum, forming a link towards *A. picta*.

HAB. Molokai, Ohia Valley, near Kaluaaha (Baldwin); Molokai (Perkins).

(79) *Amastra* (*Laminella*) *hutchinsonii* Pease.

*Helicter hutchinsonii* Pease, P. Zool. Soc. London, 1862, p. 7.

*Amastra hutchinsonii* Pease, Hartman, P. Ac. Philad. 1888, p. 45, pl. i. fig. 9.

Dr Hartman suggests, I think erroneously, that this is a synonym of *A. elongata* Newc.

HAB. Maui (Pease).

(80) *Amastra* (*Laminella*) *micans* Pfeiffer.

*Achatinella* (*Laminella*) *micans* Pfeiffer, P. Zool. Soc. London, 1859, p. 31.

*Amastra micans* Pfeiffer, Hartman, P. Ac. Philad. 1888, pl. i. fig. 10.

Dr Hartman's figure is not very good.

HAB. Oahu (Baldwin, Hutchison).

(81) *Amastra* (*Laminella*) *picta* Mighels.

*Achatinella picta* Mighels, P. Boston Soc. 11. (1845), p. 21; Newcomb, Ann. Lyc. New York, vi. p. 311 [animal]; Reeve, Conch. Icon. *Achatinella*, sp. 36; Pfeiffer, Conch.-Cab. *Achatinella*, p. 284, pl. LXVIII. figs. 28, 29 [not very good]; Bland and Binney, Ann. Lyc. New York, x. p. 335, pl. xv. fig. 6 [jaw].

*Achatinella picta* Pfeiffer, P. Zool. Soc. London, 1845 [1846], p. 90.

HAB. Maui, Lahaina and Makawao (Baldwin); Haleakala, at 4000 feet, and Iao Valley (young shells) (Perkins).



var. *bulbosa* Gulick.

*Achatinella bulbosa* Gulick, Ann. Lyc. New York, vi. (1858), p. 253, pl. viii. fig. 71.

Newcomb placed *A. bulbosa* as a synonym; it appears to me to be of varietal rank, and to differ in being larger and in the whorls being more flattened. I fancy the species will prove to be variable, as Mr Perkins' shells are more slender than the series in the Museum. Specimens sent by Mr Hutchison as from 'Maui' are still more slender, and may possibly prove to be distinct. Mighels gave, by error probably, 'Oahu.'

HAB. E. Maui, Honuaula and Kula (Gulick).

(82) *Amastra (Laminella) remyi* Newcomb.

*Achatinella remyi* Newcomb, Ann. Lyc. New York, vi. (Oct. 1855), p. 146; Amer. J. Conch. ii. (1866), p. 215, pl. xiii. fig. 13.

HAB. Lanai (Newcomb).

Only known to me from the original series in the Brit. Mus.; Pfeiffer (P. Zool. Soc. London, 1855, p. 207) gave Hawaii as the habitat, but probably this was an error.

(83) *Amastra (Laminella) sanguinea* Newcomb.

*Achatinella sanguinea* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 135, pl. xxii. fig. 15; Ann. Lyc. New York, vi. p. 326 [animal].

*Laminella ferussaci* Pfeiffer, P. Zool. Soc. London, 1855 [1856], p. 203.

HAB. Oahu, Lehu (Newcomb); Waianae and Halemano (Baldwin); Halemano, Kawailoa, and Makaha Valley (dead) (Perkins).

(84) *Amastra (Laminella) soror* Newcomb.

*Achatinella soror* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 143, pl. xxiii. fig. 38 [also fig. 36, sub nom. *A. acuta*].

HAB. Maui (Newcomb).

The additional locality of Lanai given, subsequently, by Newcomb, really, I think, refers to my *A. fraterna*.

(85) *Amastra (Laminella) straminea* Reeve.

*Achatinella straminea* Reeve, Conch. Icon. *Achatinella*, sp. 38; Newcomb, Ann. Lyc. New York, vi. p. 318 [animal].

HAB. Oahu, Panoa to Palolo (Baldwin); Nuuanu (Perkins).

(86) *Amastra (Laminella) tetrao* Newcomb.

*Achatinella tetrao* Newcomb, P. Boston Soc. v. (1855), p. 219; Ann. Lyc. New York, vi. p. 334 [animal]; Amer. J. Conch. ii. (1866), p. 214, pl. XIII. figs. 11, 12.

From the fine series collected it appears that the ground-colouring, under the zigzag periostracum, varies considerably. Shades of crimson or rich orange predominate, but occasionally the colour is confined to a band below the suture, the rest of the shell being whitish.

HAB. Lanai (Newcomb); mountains and behind Koele (Perkins).

(87) *Amastra (Laminella) venusta* Mighels.

*Achatinella venusta* Mighels, P. Boston Soc. ii. (1845), p. 21; Newcomb, Ann. Lyc. New York, vi. p. 311 [animal]; Reeve, Conch. Icon. *Achatinella*, sp. 32; Binney, Ann. Lyc. New York, xi. p. 191, pl. xiv. fig. D.

HAB. Molokai, Mapulehu (Baldwin); mountains (Perkins).

Mighels gave, but erroneously, 'Oahu' as the locality.

(88) *Amastra (Laminella) villosa* Sykes.

*Amastra villosa* Sykes, P. Malac. Soc. London, ii. (1896), p. 129.

Plate XI. fig. 24.

The specimen here figured is not the one whose measurements were given in the original diagnosis, but a slightly smaller shell whose periostracum is better preserved.

HAB. Molokai (Perkins).

## subgenus AMASTRELLA, n. subgen.

This name is proposed for a group of rotund, generally incrassated, small forms, which have been usually placed in *Amastra*. I take as the type *A. rugulosa* Pease. They are nearly all natives of Kauai, but a few species are found on other islands.

(89) *Amastra (Amastrella) anthonii* Newcomb.

*Achatinella anthonii* Newcomb, P. Calif. Ac. II. (1861), p. 93; Amer. J. Conch. II. (1866), p. 210, pl. XIII. fig. 2.

HAB. Kauai (Newcomb).

(90) *Amastra (Amastrella) antiqua* Baldwin.

*Amastra antiqua* Baldwin, P. Ac. Philad. 1895, p. 233, pl. XI. fig. 47.

HAB. Oahu, Ewa (Baldwin, as fossil).

(91) *Amastra (Amastrella) carinata* Gulick.

*Amastra carinata* Gulick, P. Zool. Soc. London, 1873, p. 83.

*Achatinella obesa* var. *agglutinans* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 143, pl. XXIII. fig. 39 a.

This appears to be specifically distinct from *A. obesa* Newc.

HAB. W. Maui, Wailuku (Gulick).

(92) *Amastra (Amastrella) cyclostoma* Baldwin.

*Amastra cyclostoma* Baldwin, P. Ac. Philad. 1895, p. 234, pl. XI. fig. 53 [animal and shell].

HAB. Kauai, Makaweli (Baldwin).

(93) *Amastra (Amastrella) nucleola* Gould.

*Achatinella nucleola* Gould, P. Boston Soc. II. (1845), p. 28.

*Achatinella brevis* Pfeiffer, P. Zool. Soc. London, 1845 [1846], p. 90.

HAB. Kauai (Newcomb); Hanalei (Baldwin).—? Oahu, Manoa Valley (Clessin, Nomenc. Helic. Viv.).

I feel doubtful as to this last locality: the *A. nucleola* Gould, of Reeve, is *A. albolabris* Newc. (cf. p. 333).

(94) *Amastra (Amastrella) obesa* Newcomb.

*Achatinella obesa* Newcomb, Ann. Lyc. New York, vi. (May, 1853), p. 24; t. c. p. 329 [animal]; P. Zool. Soc. London, 1853 [1854], p. 143, pl. xxiii. fig. 39; Binney, Ann. Lyc. New York, xi. p. 191, pl. xiv. fig. H [radula and jaw].

HAB. Maui, Makawao and Kula (Baldwin); Haleakala (Newcomb).

(95) *Amastra (Amastrella) rugulosa* Pease.

*Amastra rugulosa* Pease, P. Zool. Soc. London, 1869, p. 649 (nom. sol.); J. Conchyl. xviii. (1870), p. 95; Crosse, l. c. xxiv. (1876), p. 99, pl. i. fig. 4.

var. *similaris* Pease.

*Amastra similaris* Pease, P. Zool. Soc. London, 1869, p. 649 (nom. sol.).

*Amastra rugulosa* var. *similaris* Pease, J. Conchyl. xviii. (1870), p. 96.

Mr Perkins' specimens are small but otherwise agree with some presented by Pease to the British Museum. I have seen specimens collected by Mr Hutchison as from Oahu, but think there must be an error as to the locality.

HAB. Kauai (Pease, type and var.); Kapaa (Baldwin); Lihue (Perkins).—E. Maui, Kula (Hartman) [? an error].

(96) *Amastra (Amastrella) sphaerica* Pease.

*Amastra sphaerica* Pease, P. Zool. Soc. London, 1869, p. 649 (nom. sol.); J. Conchyl. xviii. (1870), p. 94; Crosse, l. c. xxiv. (1876), p. 98, pl. i. figs. 5, 5a.

HAB. Kauai (Pease).

The habitat is given as "? Lanai" by both Mr Baldwin and Dr Hartman, but I know not on what authority.

(97) *Amastra (Amastrella) vetusta* Baldwin.

*Amastra vetusta* Baldwin, Cat. Shells Hawaiian Islands, 1893, p. 10 (nom. sol.); P. Ac. Philad. 1895, p. 233, pl. xi. fig. 50.

HAB. Oahu, near the base of Punchbowl Hill, Honolulu, fossil (Baldwin).



subgen. KAUAIA, nom. nov.

*Carinella* Pfr. (1875) nec Sowerby (1839).

The type of Pfeiffer's group is *A. kauaiensis* Newc.: the subgeneric name was used first by Sowerby for a different group of Molluscs. Whether *A. alata* and *A. heliciformis* really belong here I am not clear.

(98) *Amastra* (*Kauaia*) *alata* Pfeiffer.

*Helix alata* Pfeiffer, P. Zool. Soc. London, 1856, p. 33.

I have elsewhere (P. Malac. Soc. London, II. p. 127) pointed out that all authors have overlooked the fact that this shell has a columellar plait. It is, in my opinion, not a Helicoid at all, but belongs to an aberrant group of *Amastra*. The columellar plait does not ascend rapidly into the shell, but stands almost horizontally, and has no final 'knob.' The single specimen found by Mr Perkins measures diam. max. 8; alt. 4; alt. apert. 3 mill.

HAB. Lanai (Pfeiffer); Mts. behind Koele (Perkins).

(99) *Amastra* (*Kauaia*) *heliciformis* Ancey.

*Amastra heliciformis* Ancey, Bull. Soc. Malac. France, VII. (1890), p. 340.

HAB. Oahu, Waianae (Ancey).

(100) *Amastra* (*Kauaia*) *kauaiensis* Newcomb.

*Achatinella kauaiensis* Newcomb, Ann. Lyc. New York, VII. (April, 1860), p. 145; Amer. J. Conch. II. (1866), p. 209, pl. XIII. fig. 1.

*Achatinella* (*Carinella*) *kauaiensis* Newc., Pfeiffer, Novit. Conch. IV. p. 115, pl. CXXVI. figs. 8—11.

A good series, principally however dead shells, of this almost extinct species. Mr Perkins notes that one specimen was found "with embryonic shells in mouth."

HAB. Kauai (authors); Halemanu (Baldwin); Makaweli at 2000 ft. and Halemanu at 4000 feet (Perkins).

(101) *Amastra* (*Kauaia*) *knudseni* Baldwin.

*Amastra knudseni* Baldwin, P. Ac. Philad. 1895, p. 234, pl. XI. figs. 43, 44.

HAB. Kauai, Halemanu (Baldwin, Perkins). A single specimen of this very fine species.

The following appear to be only MS. names: *Amastra ferruginea* Baldwin, Cat. Shells Hawaiian Islands, 1893, p. 9 (nom. sol.). HAB. Oahu, Ewa and Waianae (Baldwin).—*Amastra testudinea* Baldwin, t. c. p. 10. HAB. Oahu, Ewa (Baldwin).

## LEPTACHATINA Gould.

*Leptachatina* Gould, P. Boston Soc. II. p. 201; type *Achatinella acuminata* Gould.

It is frequently difficult to draw the line between this group and *Amastra*, and perhaps such species as *A. melampoides* Pfr. (= *A. ventulus* Fér.) may eventually be transferred to *Leptachatina*.

Pfeiffer proposed *Labiella* (Malak. Blätt. 1. 1854, p. 142) for the group with an incrassated lip, such as *A. labiata* Newc., and perhaps it may, conchologically, form a convenient section.

The species are principally from Oahu, but an elongate and generally striate group characterizes the older Islands, such as Kauai.

(1) *Leptachatina accincta* Mighels.

*Achatina accincta* (err. typ.) Mighels, P. Boston Soc. II. (1845), p. 20; Reeve, Conch. Icon. *Achatina*, sp. 101.

nec *Achatinella accincta* Gould, U.S. Explor. Exped. Mollusca, pl. VII. fig. 97.

*Achatinella granifera* Gulick, Ann. Lyc. New York, VI. (1856), p. 185, pl. VI. fig. 13; Sykes, P. Malac. Soc. London, III. pl. XIV. fig. 5.

*Achatinella* (*Leptachatina*) *margarita* Pfeiffer, P. Zool. Soc. London, 1855, p. 206.

Gulick admitted (P. Zool. Soc. London, 1873, p. 91) the identity of his species with Pfeiffer's. If Mighels' dimensions and description are accurate, I think the above identification will prove correct. The shell figured by Gould does not appear to be Mighels' species. See also a note under *L. grana* Newc.

HAB. Oahu (Mighels, Pfeiffer); Keawaawa (Gulick).

(2) *Leptachatina acuminata* Gould.

*Achatinella acuminata* Gould, P. Boston Soc. II. (1847), p. 200; U. S. Explor. Exped. Mollusca, pl. VII. fig. 100.

Plate XII. figs. 13, 13 a.

The type of the genus; the radula is figured from a dissection by Lt.-Col. H. H. Godwin-Austen, F.R.S.

HAB. Kauai (Gould); Hanalei (Baldwin); Kaholuamano (Perkins).

(3) *Leptachatina antiqua* Pease.

*Leptachatina antiqua* Pease, P. Zool. Soc. London, 1869, p. 651 (nom. sol.);

J. Conchyl. XVIII. (1870), p. 94; Crosse, J. Conchyl. XXIV. p. 98, pl. III. fig. 6.

*Leptachatina antiquata* Pease, J. Conchyl. XVIII. (1870), p. 87 [err. typ.].

HAB. Kauai (Pease); Mana (Baldwin).

(4) *Leptachatina approximans* Ancey.

*Leptachatina approximans* Ancey, Naturaliste, 1897, p. 222.

HAB. Waianae, Oahu (Ancey).

(5) *Leptachatina arborea*, n. sp.

Testa ovato-oblonga, turrita, tenuis vel tenuiuscula, dextrorsa, cornea, longitudinaliter levissime striatula; anfr. 6—7, plano-convexi, ultimus  $\frac{5}{8}$  altitudinis testae aequans; sutura bene impressa; apertura quadrato-ovata, margine dextro subincrassatulo, columellari verticali, incrassato, reflexo, plica parva vix conspicua munito. Alt. 8; diam. 3.6 mill. Plate XI. fig. 21.

The plica is very inconspicuous; the colour becomes lighter in adult specimens, and then the polished, transparent gloss disappears and the shell becomes of a straw colour. Over thirty specimens were collected by Mr Perkins; they vary slightly in shape, a few being broader in proportion to the length, and having more inflated whorls. Mr Baldwin sends me the following note: "It is found on the Candle-nut tree (*Aleurites moluccana*), among the leaves of the Bird-nest fern (*Asplenium nidus*), sometimes at a height of 30 or 40 feet. All the other known species of *Leptachatina* are terrestrial—under rocks or on dead leaves and decaying wood."

HAB. Hawaii, Kona at 4000 feet (Perkins); Olaa, Hilo (Baldwin).

(6) *Leptachatina balteata* Pease.

*Leptachatina balteata* Pease, P. Zool. Soc. London, 1869, p. 651 (nom. sol.); J. Conchyl. xviii. (1870), p. 91; Crosse, l. c. xxiv. (1876), p. 96, pl. iv. fig. 4.

Four, apparently immature, specimens; they approach this species very closely save that they do not possess the colour band, and the last whorl measures just over, rather than under, half the length of the shell. As the species is only known to me from description and figure, I think it safer to refer them here with a query than to describe them.

HAB. Kauai (Pease); Wahiawa (Baldwin); at 4000 feet (Perkins).

(7) *Leptachatina brevicula* Pease.

*Leptachatina brevicula* Pease, J. Conchyl. xvii. (1869), p. 169.

Only known to me from the description. The specimens, while slightly larger than the dimensions stated by Pease, agree well with the proportions given. The plait, which he states is "*valida, fere transversa*," seems to vary much in size and prominence.

HAB. Kauai (Pease); Kaholuamano, and at 4000 feet (Perkins).

(8) *Leptachatina (Labiella) callosa* Pfeiffer.

*Achatinella (Labiella) callosa* Pfeiffer, P. Zool. Soc. London, 1856 [1857], p. 334.

Only known to me from the unique type in the British Museum.

HAB. Oahu (Pfeiffer).

(9) *Leptachatina cercalis* Gould

*Achatinella cercalis* Gould, P. Boston Soc. II. (1847), p. 201; U. S. Explor.

Exped. Mollusca, pl. vii. fig. 99; Hartman, P. Ac. Philad. 1888, pl. i. fig. 13.

Two specimens only, which, if not this species, are probably undescribed.

HAB. Oahu, Waianae (Gould); Waianae Mts. below Kaala (Perkins).

(10) *Leptachatina chrysallis* Pfeiffer.

*Achatina chrysallis* Pfeiffer, P. Zool. Soc. London, 1855, p. 99.

This species has been united with *L. obtusa* Newc., by Mr Baldwin, but appears to me to be quite distinct; the habitat he gives of 'Wahiawa to Kawaihoa, Oahu' probably really refers to *L. obtusa*.

HAB. Hawaiian Islands (Pfeiffer).



(11) *Leptachatina cingula* Mighels.

*Achatinella cingula* Mighels, P. Boston Soc. II. (1845), p. 21.

*Leptachatina cingula* Mighels, Hartman, P. Ac. Philad. 1888, pl. I. fig. 14.

*Achatinella* (*Leptachatina*) *dimidiata* Pfeiffer, P. Zool. Soc. London, 1855, p. 205.

The *L. cingula* Mighels is unknown to me; I quote the following from Mr Hartman, "*Achatinella dimidiata* Pfeiffer, equals *cingula* Migh. in coll. Newcomb *ex Auct.* The figure of this shell in Chemnitz [i.e. Conch.-Cab. *Bulimacea*, pl. LXVII. figs. 5—7] does not represent the species, but equals an *Amastra*."

HAB. Oahu (Mighels, Pfeiffer); Halemano, Kawaiolo Gulch (Perkins).

(12) *Leptachatina clausina* Mighels.

*Bulimus clausinus* Mighels, P. Boston Soc. II. (1845), p. 20.

*Leptachatina clausiana* (sic) Mighels, Hartman, P. Ac. Philad. 1888, p. 52.

Unknown to me.

HAB. Hawaii (Mighels).

(13) *Leptachatina columna* Ancey.

*Leptachatina columna* Ancey, Naturaliste, 1889, p. 266; Sykes, P. Malac. Soc. London, III. pl. XIII. fig. 18.

Near *L. chrysallis* Pfr.

HAB. Oahu (Ancey).

(14) *Leptachatina compacta* Pease.

*Labiella compacta* Pease, J. Conchyl. XVII. (1869), p. 172.

The specimens appear to agree with Pease's description; the species has not been figured.

HAB. Maui (Pease); E. Maui (Baldwin); Haleakala, at 5000 feet (Perkins).

(15) *Leptachatina conicoides*, sp. nov.

Testa conico-ovata, imperforata, dextrorsa, tenuiuscula, cornea, apud suturas crenulata; anfr. 6, ultimus  $\frac{4}{7}$  altitudinis testae aequans; sutura subimpressa; apertura subverticalis, sinuato-oblonga, margine dextro sub-incrassatulo, columellari reflexo,

adnato, plica obliqua, parva, compressa munito, marginibus callo tenui junctis. Alt. 7.5; diam. 3.5 mill.

Plate XI. fig. 26.

A somewhat conic shell, in which, when adult, the columella plait becomes inconspicuous. One adult and three young specimens.

HAB. Molokai (Perkins).

(16) *Leptachatina convexiuscula*, sp. nov.

Testa turrita, elongata, gracilis, tenuiuscula, dextrorsa, brunneo-cornea, laevis, polita, nitida, apice obtusulo; anfr.  $6\frac{1}{2}$ , convexi, turgiduli, ultimus  $\frac{9}{16}$  altitudinis testae aequans; sutura bene impressa; apertura pyriformis, margine columellari sinuato, plica minima munito, marginibus callo tenuissimo junctis. Alt. 8; diam. 2.8 mill.

Plate XI. fig. 11.

A shell of the group of *L. exilis* Gulick, but with more inflated whorls, slightly more tapering towards the apex, and the mouth not so drawn out to the right. Three specimens.

HAB. Oahu, Waiolani (Perkins).

(17) *Leptachatina corneola* Pfeiffer.

*Achatinella corneola* Pfeiffer, P. Zool. Soc. London, 1845 [1846], p. 90.

*Achatinella corneola* Pfeiffer, Reeve, Conch. Icon. *Achatinella*, sp. 4.

HAB. Oahu? (Baldwin); Oahu, one young specimen (Hutchison).

(18) *Leptachatina coruscans* Hartman.

*Leptachatina coruscans* Hartman, P. Ac. Philad. 1888, p. 52, pl. 1. fig. 16.

A variable shell in thickness and colouration.

HAB. Molokai (Hartman); Kamalo (Baldwin); Kapanui, Kolamaula, and at 4000 ft. (Perkins).

(19) *Leptachatina costulata* Gulick.

*Achatinella costulata* Gulick, Ann. Lyc. New York, VI. (1856), p. 177, pl. VI. fig. 5; Sykes, P. Malac. Soc. London, III. pl. XIV. fig. 4.

Newcomb united this shell with *L. semicostata* Pfeiffer, but Gulick's type is much more slender than that species, the mouth is of a different shape, and other minor differences exist, all leading me to regard it as a good species.

HAB. Oahu, Pupukea, Waimea, and Kawaihoa (Gulick).

(20) *Leptachatina costulosa* Pease.

*Leptachatina costulosa* Pease, P. Zool. Soc. London, 1869, p. 651 (nom. sol.);

J. Conchyl. XVIII. (1870), p. 90; Crosse, l. c. XXIV. p. 96, pl. III. fig. 4.

HAB. Kauai (Pease); Waimea and Kealia (Baldwin).

(21) *Leptachatina crystallina* Gulick.

*Achatinella crystallina* Gulick, Ann. Lyc. New York, VI. (1856), p. 186, pl. VI. fig. 14.

Newcomb united this species with his *L. nitida*.

HAB. Oahu, Mokuleia, Kamoo, Waialua (Gulick).

(22) *Leptachatina emerita*, sp. nov.

Testa elongata, subcylindrica, imperforata, dextrorsa, cornea vel hyalina vel flava, tenuiuscula, sub lente longitudinaliter tenuiter striata, apice obtusulo; anfr.  $6\frac{1}{2}$ , plano-convexi, ultimus  $\frac{5}{8}$  altitudinis testae fere aequans; sutura impressa, marginata; apertura ovata, margine dextro sub-incrassatulo, columellari sub-reflexo, plica parva inconspicua ascendente munito. Alt. 8; diam. 3.5 mill.

Plate XI. fig. 10.

Variable in colour, shading from brown to a hyaline tint; adult specimens lose their gloss and become of a straw-yellow. The columellar plait is small and inconspicuous.

HAB. Molokai, Kalamaula, and at 4000 feet (Perkins).

(23) *Leptachatina exilis* Gulick.

*Achatinella exilis* Gulick, Ann. Lyc. New York, VI. (1856), p. 188, pl. VI. fig. 16 [bad]; Sykes, P. Malac. Soc. London, III. pl. XIV. fig. 18.

*Leptachatina cylindrata* Pease, J. Conchyl. XVII. (1869), p. 168; P. Zool. Soc. London, 1869, p. 650 (nom. sol.).

Remarkable though the distribution may be, I am unable, after a comparison of Gulick's type with specimens of *L. cylindrata* presented by Pease to the British Museum, to sever these two species.

HAB. Oahu, Keawaawa (Gulick).—Kauai (Pease); at 4000 feet (Perkins).

(24) *Leptachatina extensa* Pease.

*Leptachatina extensa* Pease, P. Zool. Soc. London, 1869, p. 651 (nom. sol.);  
J. Conchyl. xviii. (1870), p. 92.

Four specimens, agreeing fairly well with Pease's diagnosis, are referred to this species.

HAB. Kauai (Pease); Kaholuamano (Perkins).

(25) *Leptachatina fumida* Gulick.

*Achatinella fumida* Gulick, Ann. Lyc. New York, vi. (1856), p. 181, pl. vi. fig. 9;  
Sykes, P. Malac. Soc. London, iii. pl. xiv. fig. 15.

Newcomb united this with his *L. vitrea*, but they appear to me to be quite distinct.

HAB. Oahu, Waialei, Pupukea, Waimea, Kawaihoa, Halemano (Gulick).

(26) *Leptachatina fumosa* Newcomb.

*Achatinella fumosa* Newcomb, P. Zool. Soc. London, 1853 [1854, Nov.], p. 140,  
pl. xxiii. fig. 28.

HAB. Oahu, Manoa (Newcomb); Kawaihoa Gulch (Perkins). Only a single specimen.

(27) *Leptachatina fusca* Newcomb.

*Achatinella fusca* Newcomb, Ann. Lyc. New York, vi. (1853), p. 28; P. Zool.  
Soc. London, 1853 [1854, Nov.], p. 145, pl. xxiii. fig. 44.

HAB. Oahu, Manoa (Newcomb).

(28) *Leptachatina fuscula* Gulick.

*Achatinella fuscula* Gulick, Ann. Lyc. New York, vi. (1856), p. 180, pl. vi. fig. 8.

HAB. Oahu, mountain forests of Mokuleia (Gulick).



(29) *Leptachatina glutinosa* Pfeiffer.

*Achatinella* (*Laminella*) *glutinosa* Pfeiffer, P. Zool. Soc. London, 1855 [1856, Feb.], p. 204.

*Achatinella lacrima* Gulick, Ann. Lyc. New York, VI. (1856, Dec.), p. 176, pl. VI. fig. 4; Sykes, P. Malac. Soc. London, III. pl. XIV. fig. 10.

HAB. Oahu, Lihue, Kalaikoa, Wahiawa, Halemano, Peula (Gulick); Waianae Mts., below Kaala (Perkins). Only a single specimen.

(30) *Leptachatina gracilis* Pfeiffer.

*Achatinella* (*Achatinellastrum*) *gracilis* Pfeiffer, P. Zool. Soc. London, 1855, p. 6, pl. XXX. fig. 22.

*Achatinella elevata* (Newcomb) Pfeiffer, t. c. [1856, Feb.], p. 209.

*Achatinella subula* Gulick, Ann. Lyc. New York, VI. [1856, Dec.], p. 191, pl. VI. fig. 19; Sykes, P. Malac. Soc. London, III. pl. XIV. fig. 16.

Gulick's species appears to be a bandless and slightly more attenuate variety.

HAB. Oahu (various authors); Palolo Valley (Gulick); Kaala (Baldwin); Waianae Mts., below Kaala, lee side (Perkins).

(31) *Leptachatina grana* Newcomb.

*Achatinella grana* Newcomb, Ann. Lyc. New York, VI. (1853), p. 29; P. Zool. Soc. London, 1853 [1854], p. 146, pl. XXIII. fig. 46.

*Leptachatina grana* Newcomb, Bland and Binney, Ann. Lyc. New York, X. p. 336 [radula].

The types of this species have met with an accident and are entirely broken. Newcomb believed that *L. granifera* Gulick [= *L. accincta* Mighels] was a synonym, but I feel doubtful of this.

HAB. Maui, Makawao (Newcomb); Haleakala, at 5000 feet (Perkins).

(32) *Leptachatina guttula* Gould.

*Achatinella guttula* Gould, P. Boston Soc. II. (1847), p. 201; U. S. Explor. Exped. Mollusca, pl. VII. fig. 98.

*Achatinella gummea* Gulick, Ann. Lyc. New York, VI. (1856), p. 182, pl. VI. fig. 10; Sykes, P. Malac. Soc. London, III. pl. XIV. fig. 1.

*Achatinella fragilis* Gulick, t. c. p. 183, pl. VI. fig. 11; Sykes, t. c. pl. XIV. fig. 2.

Newcomb united—I think correctly—the two Gulickian species with Gould's; Mr Baldwin has, however, in his 'Catalogue' allowed them specific rank.

HAB. Oahu, Mokuleia, Lihue, Punaluu, Hauula, Halemano (Gulick).—Maui (Gould).

(33) *Leptachatina imitatrix*, sp. nov.

Testa elongata, turrita, imperforata, dextrorsa, tenuiuscula, flavido-cornea, sub lente longitudinaliter minute striata; anfr.  $6\frac{1}{2}$ , plano-convexi, ultimus  $\frac{4}{7}$  altitudinis testae aequans; sutura impressa; apertura elongato-ovalis, margine dextro arcuato, acuto, columellari incrassatulo, reflexo, plica minima, inconspicua munito, marginibus callo tenui junctis. Alt. 7; diam. 2.6 mill.

Plate XI. fig. 9.

Only a single specimen. It recalls *L. exilis* of Gulick, but is more conic—i.e. the upper whorls are narrower in proportion—and is of a light straw-yellow. The columellar plait is deeply-seated and inconspicuous.

HAB. Hawaii, Mauna Loa at 4000 feet (Perkins).

(34) *Leptachatina impressa* Sykes.

*Leptachatina impressa* Sykes, P. Malac. Soc. London, II. (1896), p. 127.

Plate XI. fig. 8.

HAB. Lanai, Mountains behind Koele (Perkins).

(35) *Leptachatina isthmica* Ancey.

*Leptachatina isthmica* Ancey, P. Malac. Soc. London, III. (1899), p. 270; Sykes, t. c. pl. XIII. fig. 20.

HAB. Maui, Sand Hills between East and West Maui, subfossil (Ancey).

(36) *Leptachatina konaensis*, sp. nov.

Testa elongato-ovata, imperforata, dextrorsa, tenuiuscula, cornea vel pallide cornea, longitudinaliter tenuiter striata, apice obtusulo; anfr. 6, planati, ultimus  $\frac{5}{8}$  altitudinis testae aequans; sutura impressa, marginata; apertura sinuato-ovata, columella arcuata, margine dextro intus subcalloso, columellari subreflexo, plica mediocri ascendente munito. Alt. 8; diam. 4 mill.

Plate XI. fig. 13.

Akin to *L. simplex* Pease, but is much more swollen and inflated. Six specimens.

HAB. Hawaii, Kona at 4000 feet (Perkins).

(37) *Leptachatina (Labiella) labiata* Newcomb.

*Achatinella labiata* Newcomb, Ann. Lyc. New York, vi. (1853), p. 27; P. Zool. Soc. London, 1853 [1854], p. 141, pl. xxiii. fig. 33; Gwatkin, P. Ac. Philad. 1895, p. 239 [radula].

*Achatinella lagena* Gulick, Ann. Lyc. New York, vi. (1856), p. 175, pl. vi. fig. 3; Sykes, P. Malac. Soc. London, iii. pl. xiv. fig. 9.

*Achatinella dentata* Pfeiffer, P. Zool. Soc. London, 1855, p. 7, pl. xxx. fig. 27.

I follow Newcomb in including Gulick's species, but the latter's type does not fully shew the thickening on the columellar wall, nor the denticle on the outer lip.

HAB. Oahu, Lehu (Newcomb); Halemano, Wahiawa, Kalaikoa (Gulick); Mount Kaala (Perkins).

(38) *Leptachatina laevis* Pease.

*Leptachatina laevis* Pease, P. Zool. Soc. London, 1869, p. 651 (nom. sol.); J. Conchyl. xviii. (1870), p. 91; Crosse, l. c. xxiv. (1876), p. 96, pl. iv. fig. 6.

HAB. Kauai (Pease); Waimea (Baldwin).

(39) *Leptachatina leucochila* Gulick.

*Achatinella leucochila* Gulick, Ann. Lyc. New York, vi. (1856), p. 173, pl. vi. fig. 1; Sykes, P. Malac. Soc. London, iii. pl. xiv. fig. 12.

Newcomb united this with *L. pyramis* Pfr.; I think it is quite distinct specifically.

HAB. Kauai (Gulick).

(40) *Leptachatina lineolata* Newcomb.

*Achatinella lineolata* Newcomb, Ann. Lyc. New York, vi. (1853), p. 29; P. Zool. Soc. London, 1853 [1854], p. 140, pl. xxiii. fig. 29.

The real habitat seems somewhat uncertain; Newcomb originally gave Maui, subsequently Hawaii, which is more probably correct.

HAB. Maui (Newcomb and Hartman).—Hawaii (Newcomb and Baldwin).

(41) *Leptachatina lucida* Pease.

*Leptachatina lucida* Pease, J. Conchyl. xviii. (1870), p. 93.

HAB. Kauai (Pease); Kealia (Baldwin).

(42) *Leptachatina marginata* Gulick.

*Achatinella marginata* Gulick, Ann. Lyc. New York, vi. (1856), p. 179, pl. vi. fig. 7.

United by Newcomb with *L. succincta* Newc., but the present species is smaller and more slender.

HAB. Oahu, Kalaikoa (Gulick).

(43) *Leptachatina nitida* Newcomb.

*Achatinella nitida* Newcomb, Ann. Lyc. New York, vi. (1853, May), p. 29; P. Zool. Soc. London, 1853 [1854], p. 140.

*Leptachatina nitida* Newcomb, Bland and Binney, Ann. Lyc. New York, x. p. 336, pl. xv. fig. 8 [radula].

The figure given by Newcomb (P. Zool. Soc. London, 1853, pl. xxiii. fig. 30) apparently has been taken by error from some other shell, and does not represent this species. The form found by Mr Perkins appears to be a variety.

HAB. E. Maui (Newcomb).—Maui and Oahu (Hartman).—Oahu, Mt Kaala (Perkins).

(44) *Leptachatina obsoleta* Pfeiffer.

*Spiraxis obsoleta* Pfeiffer, P. Zool. Soc. London, 1856, p. 335.

A species of the group of *L. sandwicensis*. Mr Perkins found a single young shell on 'Haleakala at 5000 feet,' Maui, which may be the young of this species.

HAB. ? Oahu (Baldwin).

(45) *Leptachatina obtusa* (Newcomb) Pfeiffer.

*Achatinella obtusa* Newcomb, Pfeiffer, P. Zool. Soc. London, 1855 [1856], p. 209.

Mr Baldwin has suggested that this species is identical with *L. chrysallis* Pfeiffer, but I cannot agree with him.

HAB. Hawaiian Islands.—? Oahu (Baldwin).

(46) *Leptachatina octogyrata* Gulick.

*Achatinella octogyrata* Gulick, Ann. Lyc. New York, vi. (1856), p. 190, pl. vi. fig. 18; Sykes, P. Malac. Soc. London, iii. pl. xiv. fig. 7.

Newcomb placed it as a synonym of *L. obclavata*, Pfr. [= *L. sandwicensis* Pfr.].

HAB. Oahu, Palolo Valley (Gulick).



(47) *Leptachatina oryza* Pfeiffer.

*Achatinella* (*Leptachatina*) *oryza* Pfeiffer, P. Zool. Soc. London, 1855 [1856, Feb.], p. 206.

*Achatinella triticea* Gulick, Ann. Lyc. New York, vi. (1856, Dec.), p. 184, pl. vi. fig. 12; Sykes, P. Malac. Soc. London, iii. pl. xiv. fig. 8.

HAB. Oahu, subfossil (Pfeiffer); Keawaawa (Gulick).

(48) *Leptachatina* (*Labiella*) *pachystoma* Pease.

*Labiella pachystoma* Pease, J. Conchyl. xvii. (1869), p. 171.

I am not sure if this be a true *Labiella*.

HAB. Kauai (Pease).

(49) *Leptachatina perkinsi* Sykes.

*Leptachatina perkinsi* Sykes, P. Malac. Soc. London, ii. (1896), p. 128.

Plate XI. fig. 30.

HAB. Lanai, Mts. behind Koele (Perkins).

(50) *Leptachatina petila* Gulick.

*Achatinella petila* Gulick, Ann. Lyc. New York, vi. (1856), p. 189, pl. vi. fig. 17; Sykes, P. Malac. Soc. London, iii. pl. xiv. fig. 14.

United by Newcomb with *L. fusca* Newc., but appears to me to be quite distinct.

HAB. E. Oahu, Koko (Gulick).

(51) *Leptachatina pyramis* Pfeiffer.

*Achatinella pyramis* Pfeiffer, P. Zool. Soc. London, 1845 [1846], p. 90; Reeve, Conch. Icon. *Achatinella*, sp. 41 [good].

Appears from its form to be an Oahu species, and I am not sure that Pease's localization will prove correct.

HAB. Kauai (Pease).

(52) *Leptachatina resinula* Gulick.

*Achatinella resinula* Gulick, Ann. Lyc. New York, vi. (1856), p. 174, pl. vi. fig. 2 ;  
Sykes, P. Malac. Soc. London, III. pl. XIV. fig. 11.

HAB. Oahu, Kawailoa, Waialei, and other localities (Gulick).

(53) *Leptachatina saccula* Hartman.

*Achatinella* (*Leptachatina*) *saccula* Hartman, P. Ac. Philad. 1888, p. 55, pl. 1.  
fig. 15.

HAB. Hawaiian Islands (Hartman).

(54) *Leptachatina sandwicensis* Pfeiffer.

*Achatina sandwicensis* Pfeiffer, P. Zool. Soc. London, 1846 [May], p. 32.

*Achatinella* (*Leptachatina*) *obclavata* Pfeiffer, Op. cit. 1855 [July], p. 98.

*Leptachatina octavula* Paetel, Clessin, Nomenc. Helic. Viv. 1881, p. 316.

Pfeiffer placed his *Achatina sandwicensis* in the synonymy of *L. accincta* Mighels ;  
the above identification is from an examination of Pfeiffer's types.

HAB. Oahu (Pfeiffer) ; Waianae Mts. (Perkins). One young specimen only.

(55) *Leptachatina saxatilis* Gulick.

*Achatinella saxatilis* Gulick, Ann. Lyc. New York, vi. (1856), p. 187, pl. vi.  
fig. 15 ; Sykes, P. Malac. Soc. London, III. pl. XIV. fig. 17.

*Leptachatina saxatilis* Gulick, Hartman, P. Ac. Philad. 1888, p. 55.

HAB. Oahu, Mokuleia (Gulick).

(56) *Leptachatina sculpta* Pfeiffer.

*Achatina sculpta* Pfeiffer, P. Zool. Soc. London, 1855 [1856], p. 211.

HAB. Oahu (Pfeiffer) ; (Hutchison, one specimen).

(57) *Leptachatina scutilus* Mighels.

*Bulinus scutilus* Mighels, P. Boston Soc. II. (1845), p. 20.

HAB. Oahu (Mighels).

(58) *Leptachatina semicostata* Pfeiffer.

*Achatinella* (*Leptachatina*) *semicostata* Pfeiffer, P. Zool. Soc. London, 1855 [1856, Feb.], p. 206.

Dr Hartman remarks (P. Ac. Philad. 1888, p. 55) "Dr Newcomb thinks it questionable if this species be not a synonym of *L. fusca* Newc."; it is quite distinct.

HAB. Hawaiian Islands (Pfeiffer).

(59) *Leptachatina semipicta* Sykes.

*Leptachatina semipicta* Sykes, P. Malac. Soc. London, 11. (1896), p. 128.

Plate XI. fig. 12.

HAB. Lanai, Mts. behind Koele (Perkins).

(60) *Leptachatina simplex* Pease.

*Leptachatina simplex* Pease, P. Zool. Soc. London, 1869, p. 651 (nom. sol.); J. Conchyl. xvii. 1869, p. 170.

Dr Hartman notes (P. Ac. Philad. 1888, p. 55) that "Examples *L. nitida* Newc. (coll. Newc.) and *L. simplex* Pse. (coll. Pse.) are similar." There must be some error here, as specimens presented by Pease to the British Museum are quite distinct from *L. nitida* Newc.; further, Newcomb's species does not come from Hawaii.

HAB. Hawaii (Pease); Kona, at 3000—4000 feet (Perkins).

(61) *Leptachatina smithi* Sykes.

*Leptachatina smithi* Sykes, P. Malac. Soc. London, 11. (1896), p. 128.

Plate XI. fig. 29.

HAB. Lanai, Mts. behind Koele (Perkins).

(62) *Leptachatina stiria* Gulick.

*Leptachatina stiria* Gulick, Ann. Lyc. New York, vi. (1856), p. 194, pl. vi. fig. 2.

HAB. Oahu, Halemano, Peula, Kawaihoa (Gulick).

(63) *Leptachatina striata* Newcomb.

*Tornatellina striata* Newcomb, P. Calif. Ac. II. (1861), p. 93.

From the description this appears to be close to *L. lucida* Pease.

HAB. Kauai (Newcomb).

(64) *Leptachatina striatella* Gulick.

*Achatinella striatella* Gulick, Ann. Lyc. New York, VI. (1856), p. 178, pl. VI. fig. 6;  
Sykes, P. Malac. Soc. London, III. pl. XIV. fig. 19.

United by Newcomb with *L. fusca* Newc., but appears to me to be distinct.

HAB. Oahu, Keawaawa (Gulick).

(65) *Leptachatina striatula* Gould.

*Achatinella striatula* Gould, P. Boston Soc. II. (1845), p. 28.

*Achatinella clara* Pfeiffer, P. Zool. Soc. London, 1845 [1846, Jan.], p. 90; Reeve,  
Conch. Icon. *Achatinella*, sp. 5.

A nice series, shewing both the form with the sutural band and the unicolorous variety.

HAB. Kauai (various authors); Makaweli, Kaholuamano, Lihue, and at 4000 ft. (Perkins).

(66) *Leptachatina succincta* Newcomb.

*Achatinella succincta* Newcomb, P. Boston Soc. V. (1855), p. 220; Amer. J. Conch.  
II. (1866), p. 213, pl. XIII. fig. 7.

*Leptachatina succinata* Newcomb, Hartman, P. Ac. Philad. 1888, p. 55 (err. typ.).

HAB. Oahu, Ewa (Newcomb); Halemano (Perkins). One specimen only.

(67) *Leptachatina supracostata*, sp. nov.

Testa elongata, turrita, imperforata, dextrorsa, tenuis, cornea, polita; anfr. 8, ultimus  $\frac{1}{2}$  longitudinis testae fere aequans, primi apud suturas subcostulati, reliqui fere laeves; sutura impressa, marginata, linea spirali notata; apertura lunata, columella sub-arcuata; margine dextro sub-incrassatulo, columellari sub-reflexo, plica minima oblique torta munito. Alt. 6.3; diam. 2 mill.

Plate XI. fig. 22.



Only two specimens. It belongs to the group of *L. exilis* Gulick; is inconspicuously costulate below the suture, the sculpture gradually fading out, until the last whorl hardly shews any marking beyond the lines of growth. There is a faint spiral line just below the suture.

HAB. Lanai, Mts. behind Koele (Perkins).

(68) *Leptachatina tenebrosa* Pease.

*Labiella tenebrosa* Pease, P. Zool. Soc. London, 1869, p. 651 (nom. sol.).

*Leptachatina tenebrosa* Pease, J. Conchyl. xviii. (1870), p. 92; Crosse, l. c. xxiv. (1876), p. 96, pl. iii. fig. 5.

HAB. Kauai (Pease); Wahiawa (Baldwin); Kaholuamano, and at 4000 feet (Perkins).

(69) *Leptachatina tenuicostata* Pease.

*Leptachatina tenuicostata* Pease, J. Conchyl. xvii. (1869), p. 170.

HAB. Hawaii (Pease).—Oahu (Baldwin).

I feel doubts as to the accuracy of the last locality, as Mr Baldwin marks it as a species he has not seen.

(70) *Leptachatina terebralis* Gulick.

*Achatinella terebralis* Gulick, Ann. Lyc. New York, vi. (1856), p. 193, pl. vi. fig. 21; Sykes, P. Malac. Soc. London, iii. pl. xiv. fig. 3.

HAB. Oahu, Kawailoa (Gulick); Waianae Mts., below Kaala (Perkins).

(71) *Leptachatina teres* Pfeiffer.

*Achatinella (Leptachatina) teres* Pfeiffer, P. Zool. Soc. London, 1855 [1856], p. 206.

Near *L. obtusa* Newcomb.

HAB. Hawaiian Islands.

(72) *Leptachatina turgidula* Pease.

*Labiella turgidula* Pease, P. Zool. Soc. London, 1869, p. 651 (nom. sol.).

*Leptachatina turgidula* Pease, J. Conchyl. xviii. (1870), p. 89; Crosse, l. c. xxiii. (1876), p. 96, pl. iv. fig. 5.

HAB. Kauai (Pease); Halemanu (Baldwin); Makaweli (Perkins). Five specimens.

(73) *Leptachatina turrita* Gulick.

*Achatinella turrita* Gulick, Ann. Lyc. New York, vi. (1856), p. 192, pl. vi. fig. 20;  
Sykes, P. Malac. Soc. London, III. pl. XIV. fig. 6.

United by Newcomb with *L. obclavata* Pfr. [= *L. sandwicensis* Pfr.], but *L. turrita* is a broader and stouter shell, of a darker colour.

HAB. Oahu, Lihue (Gulick).

(74) *Leptachatina vana* sp. nov.

Testa pyramidato-conica, dextrorsa, imperforata, tenuiuscula, brunneo-cornea, nitida, sub lente obsolete longitudinaliter striata, sutura marginata; anfr. 8, lente accrescentes, ultimus  $\frac{5}{8}$  altitudinis testae aequans; apertura pyriformis, margine dextro acuto, columellari sub-reflexo, sinuato, plica mediocri munito, marginibus callo tenuissimo junctis. Alt. 7·8; diam. 3·9 mill. Plate XI. fig. 27.

Four specimens of a brownish-horny, pyramidal shell, which has no striking characteristics.

HAB. Oahu, Mt. Kaala (Perkins).

(75) *Leptachatina vitrea* Newcomb.

*Achatinella vitrea* Newcomb, P. Zool. Soc. London, 1853 [1854], p. 142, pl. XXIII. fig. 34.

HAB. Oahu, Manoa (Newcomb).

(76) *Leptachatina vitreola* Gulick.

*Achatinella vitreola* Gulick, Ann. Lyc. New York, vi. (1856), p. 194, pl. vi. fig. 23.  
*Achatinella parvula* Gulick, t. c. p. 195, pl. vi. fig. 24; Sykes, P. Malac. Soc. London, III. pl. XIV. fig. 13.

Both were united by Newcomb with his *L. grana*; they appear to me to be quite distinct from that species.

HAB. Hawaiian Islands (Gulick); W. Maui (Baldwin for *L. parvula*).

## THAANUMIA Ancey.

*Thaanumia omphalodes* Ancey.

*Thaanumia omphalodes* Ancey, P. Malac. Soc. London, III. (1899), p. 269, pl. XII. fig. 8.

The type, and only, species.

HAB. Oahu, Waianae Mountains (Ancey).

## CARELIA H. and A. Adams.

*Carelia* H. and A. Adams, Genera of Recent Mollusca, II. (Feb. 1855) p. 132.

This interesting genus, confined to Kauai save for one species on the Island of Niihau, was described by Messrs H. and A. Adams, with no named type.

The anatomy has been described by Binney, P. Ac. Philad. 1876, p. 185, who points out that it agrees in general with the *Amastra* group, but differs in having a costate jaw.

(1) *Carelia bicolor* Jay.

*Achatina bicolor* Jay, Cat. Shells, Ed. III. (1839), p. 119, pl. VI. fig. 3.

*Carelia bicolor* Jay, Binney, P. Ac. Philad. 1876, p. 185, pl. VI. [anatomy].

*Achatina adusta* Gould, P. Boston Soc. II. (1845), p. 26.

*Carelia adusta* Gould, var. *angulata* Pease, J. Conchyl. XVIII. (1870), p. 403.

*Achatina fuliginea* Pfeiffer, P. Zool. Soc. London, 1852 [1854], p. 66; Conch.-

Cab. *Achatina*, p. 267, pl. XLIII. figs. 21, 22.

HAB. Kauai (various authors).

(2) *Carelia cochlea* Reeve.

*Achatina cochlea* Reeve, Conch. Icon. *Achatina*, sp. 5.

The spiral sculpture is nearly obsolete in some specimens; I have seen one measuring 61 mill. in length.

HAB. Kauai (various collectors).

(3) *Carelia cumingiana* Pfeiffer.

*Spiraxis cumingiana* Pfeiffer, P. Zool. Soc. London, 1855, p. 106, pl. XXXII. fig. 1.

HAB. Kauai (Pfeiffer, &c.).

(4) *Carelia dolei* Ancey.

*Carelia dolei* Ancey, Mem. Soc. Zool. France, vi. (1893), p. 328.

HAB. Kauai, Hanalei (Ancey); Haena, subfossil (Baldwin).

(5) *Carelia glutinosa* Ancey.

*Carelia glutinosa* Ancey, Mem. Soc. Zool. France, vi. (1893), p. 324.

HAB. Probably Kauai. Unknown to me.

(6) *Carelia olivacea* Pease.

*Carelia olivacea* Pease, Amer. J. Conch. ii. (1866), p. 293.

*Carelia variabilis* Pease, J. Conchyl. xviii. (1870), p. 402 [with var. *viridis*];  
P. Zool. Soc. London, 1871, p. 473.

I do not quite follow why Pease described *C. variabilis*, when, in the same paper, he stated that it and *C. olivacea* were varieties of one species.

HAB. E. Kauai (Pease).

(7) *Carelia paradoxa* Pfeiffer.

*Spiraxis paradoxa* Pfeiffer, P. Zool. Soc. London, 1853, p. 128.

Differs from all others known to me in its strongly granulated surface.

HAB. Kauai.

(8) *Carelia sinclairi* Ancey.

*Carelia sinclairi* Ancey, Mem. Soc. Zool. France, v. (1892), p. 720.

HAB. Niihau, subfossil (Ancey).

(9) *Carelia turricula* Mighels.

*Achatina turricula* Mighels, P. Boston Soc. ii. (1845), p. 20.

*Carelia turricula* Mighels, Kobelt, J. B. Malak. Ges. ii. (1875), p. 225, pl. vii.  
fig. 1.

*Achatina obeliscus* Reeve, Conch. Icon. *Achatina*, sp. 129.

*Achatina newcombi* Pfeiffer, P. Zool. Soc. London, 1851 [1853], p. 262.

HAB. Kauai, Hanalei (Baldwin, Perkins).



## AURICULELLA Pfeiffer.

*Auriculella* Pfeiffer, P. Zool. Soc. London, 1855, p. 1; Mal. Blätt. II. p. 3.

The type appears to be the *Partula auricula* Fér.

(1) *Auriculella ambusta* Pease.

*Auriculella ambusta* Pease, J. Conchyl. XVI. (1868), p. 345.

Probably the locality suggested by Mr Baldwin is correct.

HAB. Oahu ? (Baldwin).

(2) *Auriculella auricula* Fér.

*Partula auricula* Férussac, Prodr. p. 66, no. 6; Voy. de Freycinet, Zool. p. 486.

*Auricula owaihiensis* Chamisso, Nov. Act. Leop. XIV. (1829), p. 639, pl. XXXVI. fig. 1.

*Auricula sinistrorsa* Chamisso, tom. cit. p. 640, pl. XXXVI. fig. 2 [spec. juv.].

*Partula dumartroyi* Souleyet, Rev. Zool. V. (1842), p. 102.

*Bulinus armatus* Mighels, P. Boston Soc. II. (1845), p. 19.

This species varies greatly in size and shape; it is generally unicolorous, varying, from nearly white, through shades of yellow and green, to brownish green; a few specimens have a single brown band.

HAB. Oahu, Mount Tantalus, Mount Kaala, Halemano, Head of Kawaihoa Gulch (Perkins).

(3) *Auriculella brunnea* Smith.

*Auriculella brunnea* Smith, P. Zool. Soc. London, 1873, p. 88, pl. x. fig. 23; Gwatkin, P. Ac. Philad. 1895, p. 238 [radula].

Two Lanai specimens have a single darker band at the periphery; others are unicolorous.

HAB. Molokai and Lanai (Smith); Molokai, Kalamaula, also Lanai, behind Koele (Perkins).

(4) *Auriculella cerca* Pfeiffer.

*Achatinella cerca* Pfeiffer, P. Zool. Soc. London, 1855, p. 2, pl. xxx. fig. 21.

Pease has suggested (J. Conchyl. xvi. p. 343) that this is identical with *A. petitiiana* Pfeiffer; he is not improbably correct, but I have only seen the single type specimen.

HAB. Molokai (Nevill, fide specimens from Newcomb).

(5) *Auriculella chamissoi* Pfeiffer.

*Achatinella (Auriculella) chamissoi* Pfeiffer, P. Zool. Soc. London, 1855, p. 98.

HAB. Oahu (Baldwin).—Hawaii (fide tablet in Brit. Mus.).

(6) *Auriculella crassula* Smith.

*Auriculella crassula* Smith, P. Zool. Soc. London, 1873, p. 88, pl. x. fig. 22.

*Auriculella ponderosa* Ancey, Bull. Soc. Malac. France, vi. (1889), p. 225.

HAB. Maui, Makawao (Baldwin); Iao Valley, Olinda, and Haleakala at 4000 feet (Perkins).

(7) *Auriculella diaphana* Smith.

*Auriculella diaphana* Smith, P. Zool. Soc. London, 1873, p. 87, pl. x. fig. 25.

*Auriculella patula* Smith, tom. cit. p. 88, pl. x. fig. 24.

HAB. Oahu, various localities (Smith); Mount Tantalus, and head of Panoa Valley (Perkins).

(8) *Auriculella expansa* Pease.

*Auriculella expansa* Pease, J. Conchyl. xvi. (1868), p. 343, pl. xiv. fig. 8.

HAB. Hawaiian Islands (Pease).—Probably Maui (Ancey).—Kauai (Baldwin).

(9) *Auriculella lurida* Pfeiffer.

*Tornatellina castanea* Pfeiffer, Mon. Helic. Viv. III. (1853), p. 524.

*Achatinella (Auriculella) lurida* Pfeiffer, Mon. Helic. Viv. iv. p. 570.

Pfeiffer re-named the species, apparently to avoid confusion with *Achatinella castanea* Reeve.

HAB. Maui ? (Baldwin).—Oahu, Mount Tantalus (Perkins).

(10) *Auriculella newcombi* Pfeiffer.

*Balea newcombi* Pfeiffer, P. Zool. Soc. 1852 [1854], p. 67.

*Achatinella obeliscus* Pfeiffer, Malak. Blätt. II. (1855), p. 166.

HAB. Molokai, Kalamaula (Perkins).

(11) *Auriculella obliqua* Ancey.

*Auriculella obliqua* Ancey, Mem. Soc. Zool. France, v. (1892), p. 721; Sykes, P. Malac. Soc. London, III. p. 275, pl. XIII. fig. 17.

Appears to be very near *A. ambusta* Pease.

HAB. Oahu, Waianae Mts. (Baldwin).

(12) *Auriculella perkinsi* sp. nov.

Testa subperforata, elongato-conica, brunnea aut corneo-brunnea, linea brunnea ad peripheriam saepe notata, nitida; anfr. 6—6½, planiusculi, ultimus  $\frac{2}{3}$  altitudinis testae aequans; apertura auriformis, intus brunnea, margine parietali lamina obliqua intrante, columellari lamina volvente munitis; peristoma leviter reflexum, incrassatulum. Alt. 8; lat. 4 mill.

Plate XI. figs. 17, 18.

var. *a.* Magis elongata et tenuior, flavida, peristomate albido.

I cannot identify this species with any of the numerous varieties of *A. auricula*, and therefore describe it. It is very variable in colour, shading from rich brown to light yellow: when brown the band—if present—is yellowish, and conversely. The lip varies in colour from dark brown to white. It is a fairly thin shell and appears to be common.

HAB. Oahu, ridges round Nuuanu, and Mount Tantalus (Perkins).

(13) *Auriculella petitiana* Pfeiffer.

*Tornatellina petitiana* Pfeiffer, Zeitsch. Malak. IV. (1847), p. 149; Kuster, Conch.-Cab. *Tornatellina*, p. 153, pl. XVIII. figs. 24, 25.

HAB. Hawaiian Islands.

See a note under *A. cerea*.

(14) *Auriculella perpusilla* Smith.

*Auriculella perpusilla* Smith, P. Zool. Soc. London, 1873, p. 87, pl. x. fig. 26.

HAB. Oahu, Kahalu (Smith).

(15) *Auriculella pulchra* Pease.

*Auriculella pulchra* Pease, J. de Conchyl. xvi. (1868), p. 346, pl. xiv. fig. 6.

Specimens presented by Pease to the British Museum under this name do not quite agree with his diagnosis, and his figure appears to have been drawn from a variety which he notes, and not the type form. I have followed the identified specimens; possibly it is a variable species, or an error may have occurred in translating his paper.

HAB. Oahu (authors); Mount Tantalus and Mount Kaala (Perkins).

(16) *Auriculella tenella* Ancey.

*Auriculella tenella* Ancey, Bull. Soc. Malac. France, vi. (1889), p. 232.

HAB. Oahu, Waianae (Ancey).

(17) *Auriculella tenuis* Smith.

*Auriculella tenuis* Smith, P. Zool. Soc. London, 1873, p. 87, pl. x. fig. 27.

Mons. Ancey has described (Bull. Soc. Malac. France, vi. p. 230) a var. *solida*.

HAB. Oahu, various localities (Smith).

(18) *Auriculella triplicata* Pease.

*Auriculella triplicata* Pease, J. de Conchyl. xvi. (1868), p. 346.

HAB. Maui (Hartman).—Oahu, Tantalus and Panoa (Baldwin).

(19) *Auriculella uniplicata* Pease.

*Auriculella uniplicata* Pease, J. de Conchyl. xvi. (1868), p. 344, pl. xiv. fig. 7.

HAB. Maui (Pease); West Maui (Baldwin).—Molokai, Kalamaula, and above Pelekunu (Perkins).



(20) *Auriculella westerlundiana* Ancey.

*Auriculella westerlundiana* Ancey, Bull. Soc. Malac. France, vi. (1889), p. 218;  
Sykes, P. Malac. Soc. London, iii. p. 275, pl. xiii. fig. 21.

HAB. Hawaii, Kona, and Waimea (Ancey); Kona at 3000 feet, and Olaa (Perkins).

## INSUFFICIENTLY KNOWN OR ERRONEOUSLY RECORDED SPECIES.

The following appear to be only manuscript names: *jucunda* Smith; *solida* Gulick; *solidissima* Smith (confer Ann. Lyc. New York, x. pp. 331—2).

*Bulinus pumicatus* Mighels, P. Boston Soc. ii. p. 19.

HAB. Oahu.

Probably this is really an *Auriculella*; I am totally unacquainted with it.

*Partula pusilla* Gould, P. Boston Soc. ii. p. 197; U. S. Explor. Exped. Mollusca, pl. vii. fig. 90.

This species has been referred to *Auriculella*, and consequently a Hawaiian habitat has been suggested for it; it is really, however, a *Tornatellina* and was described from Metia [= Mata].

## FRICKELLA Pfeiffer.

*Frickella* Pfeiffer, P. Zool. Soc. London, 1855, p. 2; Mal. Blätt. ii. p. 3.

*Frickella amoena* Pfeiffer.

*Achatinella* (*Frickella*) *amoena* Pfeiffer, P. Zool. Soc. London, 1855, p. 2, pl. xxx. fig. 3.

This aberrant species appears to be a link between *Achatinella* and *Tornatellina*. The single young shell, found by Mr Perkins, does not quite agree with the type, as the whorls are flatter, but I am unable to sever it specifically.

HAB. Oahu, Konahuanui (Baldwin); Halemano (Perkins).

## TORNATELLINIDAE.

## TORNATELLINA Beck.

Beck (Index Moll. 1837, p. 80) proposed this name as a subgenus of *Achatina*, and placed in it four species, all of them undiagnosed. Pfeiffer in 1841 (Symb. Hist. Helic. pt. 2, p. 5) diagnosed the genus and gave (p. 130) a list of species. Previously to this Anton had proposed (1839) *Strobilus*, but in considering his claims it should be borne in mind that *Strobila* had twice previously been used in Zoology.

The Hawaiian species appear to be but little understood: the only attempt at figuring them was made by Gould, whose six figures, under one name, represent three different species.

I have endeavoured to avoid the creation of synonyms by a careful study of the descriptions and measurements given by the various authors. The habitat in the case of these very small shells is not always reliable, as they are very liable to be transported with plants, &c.

(1) *Tornatellina baldwini* Ancey.

*Tornatellina baldwini* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 238.

HAB. Oahu, Tantalus (Ancey); Waianae Mts. (Perkins).—Kauai (Baldwin).

(2) *Tornatellina compacta* sp. nov.

Testa perforata, ovata, brunneo-cornea, nitidula, tenuis; spira curta, apice obtusulo; anfr. 5—5½, lineis incrementi bene notati, convexiusculi, regulariter et lente crescentes, sutura bene impressa; apertura ovato-pyriformis, lamina unica pygmaea volventi interdum praedita; peristoma simplex, margine columellari reflexo et expanso. Alt. 2.2, diam. 1.2 mm.

Plate XI. fig. 1.

A compressed, compact little form, the aperture measuring about  $\frac{2}{5}$  of the length; the whorls are somewhat convex.

HAB. Hawaii, Mauna Loa at 2000 feet, on hilo grass (Perkins).

(3) *Tornatellina confusa* sp. nov.

*Pupa peponum* Gould, P. Boston Soc. II. (1847), p. 197; U. S. Explor. Exped. Mollusca, pl. VII. figs. 104 a—c.

See for remarks under *Tornatellina peponum* Gould; this is the edentulous form figured by him.

HAB. Kauai, Makaweli (Perkins).

(4) *Tornatellina cylindrica* sp. nov.

Testa elongata, cylindrica, cornea, perforata; anfr. 5—5½, convexiusculi, striatuli, ultimus rotundatus,  $\frac{2}{3}$  altitudinis testae aequans, sutura impressa; apertura ovata vel lunaris, lamellam in pariete gerens; columella incrassata, albida, contorta, interdum denticulo mediocri munita. Alt. 2.2, lat. vix 1 mm.

Plate XI. fig. 28.

This species may be distinguished from the true *T. peponum*, by its smaller size and more slender shape.

HAB. Oahu, Waianae Mts. (Perkins).—Kauai, Makaweli, one specimen (Perkins).

(5) *Tornatellina dentata* Pease.

*Tornatellina dentata* Pease, P. Zool. Soc. London, 1871, p. 460.

I identify Mr Perkins' specimens with some doubt; if not this species they belong to no other recorded Hawaiian form.

HAB. Hawaii (Pease); Puna (Baldwin); Kona at 3000 feet (Perkins).

(6) *Tornatellina euryomphala* Ancey.

*Tornatellina euryomphala* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 239.

Not found by Mr Perkins; I have specimens from another source, without indication as to which island they come from.

HAB. W. Maui (Ancey).

(7) *Tornatellina extincta* Ancey.

*Tornatellina extincta* Ancey, Bull. Soc. Malac. France, VII. (1890), p. 341.

HAB. Central Maui, subfossil (Ancey).

(8) *Tornatellina gracilis* Pease.

*Tornatellina gracilis* Pease, P. Zool. Soc. London, 1871, p. 460.

A single shell, found by Mr Perkins, agrees well with Pease's description and measurements, save that Pease speaks of the shell being sometimes spirally sulcate, while Mr Perkins' specimen shews traces of a single spiral thread at the periphery.

HAB. Kauai (Pease).—? Hawaii, Kona at 3000 feet (Perkins).

(9) *Tornatellina newcombi* Pfeiffer.

*Tornatellina newcombi* Pfeiffer, P. Zool. Soc. London, 1856, p. 335.

I am not quite clear if the localities are to be relied on; the figure given by Gould (as *T. peponum*, U. S. Explor. Exped. Moll. pl. vii. fig. 104 *e*) does not, I think, represent this species, as has been suggested.

HAB. Maui and Oahu (Ancey).—Kauai, Oahu, and Maui (Baldwin).

(10) *Tornatellina oblonga* Pease.

*Tornatellina oblonga* Pease, P. Zool. Soc. London, 1864, p. 673; Binney, Ann. Lyc. New York, xi. p. 190 [radula].

*Tornatellina bacillaris* Mousson, J. Conchyl. xix. (1871), p. 16, pl. iii. fig. 5.

*Tornatellina oblongata* Pease, Clessin, Nom. Helic. Viv. 1881, p. 343 (err. typ.).

Unknown to me as Hawaiian; it was described from the Tonga Islands.

HAB. Oahu, Manoa (Ancey).

(11) *Tornatellina peponum* Gould.

*Pupa peponum* Gould, P. Boston Soc. ii. (1847), p. 197; U. S. Explor. Exped. Mollusca, pl. vii. figs. 104, 104 *d*.

Gould has undoubtedly confused three species under this name: which it therefore becomes necessary to restrict to one of his forms. I propose that it should be used for the shells figured by him as fig. 104 and fig. 104 *d*; namely the slender species with a parietal lamina and no columellar tooth: of this I have Hawaiian specimens.

The next form, that figured as figs. 104 *a—c*, has no parietal lamina, and equally no teeth on the columella; this has been found by Mr Perkins on Kauai, and is here named *T. confusa*.

The third form, figured as fig. 104 *e* (enlargement of mouth only) is a shell nearly related to *T. curyomphala*, Ancey; it is not, I think, *T. newcombi*.

HAB. Hawaii, Hilo, also Oahu (Gould).

(12) *Tornatellina perkinsi*, sp. nov.

Testa elongato-pyramidalis, subperforata, cornea, sub lente striatula; anfr. 7, planiusculi, lente accrescentes, sutura subimpressa; apertura ovata, lamellam sat minutam in pariete gerens; columella incrassata, albida, plicis duabus inconspicuis praedita. Alt. 3, lat. 1.2 mm.

Plate XI. fig. 14.



Its most noteworthy features are the very elongately pyramidal shape, flattened whorls, and the two inconspicuous plicae on the columella, the upper one being more deeply seated than the lower.

HAB. Kauai, Kaholuamano at 4000 feet (Perkins).

(13) *Tornatellina trochoides* sp. nov.

Testa profunde perforata, cornea, pyramidalis, pellucida, fere laevis; spira conoidea, apice acutiusculo; anfr.  $7-7\frac{1}{2}$ , regulariter lenteque accrescentes, planiusculi, ultimus ad peripheriam subcarinatus, sutura impressa; apertura quadrato-ovata, superne angulata, laminam conspicuam validam in pariete gerens; columella brunnea, incrassata, plicis duabus munita. Alt. 4, lat. 2 mm.

Plate XI. fig. 31.

Closely related, apparently, to *T. umbilicata* Ancey; but differs from it in the relative proportions of height and breadth.

HAB. Lanai Mountains (Perkins).

(14) *Tornatellina umbilicata* Ancey.

*Auriculella umbilicata* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 232.

*Tornatellina umbilicata* Ancey, Mém. Soc. Zool. France, v. p. 721.

HAB. Maui, Lahaina (Ancey).

Fam. STENOGYRIDAE.

OPEAS Albers.

*Opeas* Albers, Die Heliceen, 1850, p. 175; Martens, Die Heliceen, Ed. 2, 1860, p. 265 (type *Bulimus goodalli* Miller).

(1) *Opeas junceus* Gould.

*Bulimus junceus* Gould, P. Boston Soc. II. (1847), p. 191; U. S. Explor. Exped. Moll. pl. VII. fig. 87.

HAB. Hawaiian Islands (Gould); all the islands (Baldwin).—Oahu, Waianae Mts. (Perkins).

(2) *Opeas prestoni* Sykes.

*Opeas prestoni* Sykes, P. Malac. Soc. London, III. (1898), p. 73, pl. v. fig. 4.

A long series, which I am entirely unable to sever from the shell recently described by me from Ceylon. The whole genus, however, is notorious for having been discovered in widely separated localities, and probably this species has been transported with plants.

HAB. Hawaii, Kawailoa, Mauna Loa at 1500 feet (Perkins).

(3) *Opeas pyrgiscus* Pfeiffer.

*Bulinus pyrgiscus* Pfeiffer, P. Zool. Soc. London, 1861, p. 24; Malak. Blätt. 1861, p. 15; Novit. Conch. III. p. 425, pl. xcvi. figs. 10—12.

This form does not seem to have been found in recent years.

HAB. Hawaiian Islands (Pfeiffer).

*Opeas striolata* Pease, is recorded as Hawaiian by Nevill (Handlist Ind. Mus. pt. 1. 1878, p. 166); it appears to be a manuscript name only.

## CAECILIOIDES (Blainville) Herrmannsen.

(1) *Caeciloides baldwini* Ancey.

*Caccilianella baldwini* Ancey, Mem. Soc. Zool. France, v. (1892), p. 718.

I have followed Mr Smith (J. Conch. VI. pp. 341—342) as to the generic name.

HAB. Oahu, Manoa (Ancey).

## Fam. SUCCINEIDAE.

## SUCCINEA Draparnaud.

*Succinea* Draparnaud, Tabl. des Moll. 1801, p. 55 (first species *S. amphibia* Drap.).

The large number of unfigured species described from the Hawaiian Islands renders the identification of specimens belonging to this puzzling group by no means an easy task.

Pease proposed (J. Conchyl. XVIII. 1870, p. 89) the genus *Catinella* for *Succinea rubida*; also the genus *Truella* (P. Zool. Soc. London, 1871, p. 459) for *S. elongata*. I have thought it best to leave all the forms in *Succinea*, and have listed the species in alphabetical order.

Two species collected by Mr Perkins still await identification; they are not improbably new, but so many of the described species are unknown to me that I consider it safer to leave them for the present. One is from Honolulu and Waianae Mts. in Oahu, with a dwarf variety from the mountains of Molokai at 4000 feet; the other from Kau, Hawaii: both belong to the group of *S. canella* Gould.

(1) *Succinea aurulenta* Ancey.

*Succinea aurulenta* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 242; Sykes, P. Malac. Soc. London, III. p. 275, pl. XIII. fig. 4.

HAB. Hawaii, North Kona (Baldwin); Kona at 3000 feet (Perkins).

(2) *Succinea baldwini* Ancey.

*Succinea baldwini* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 250.

The specimens are identified from the description alone.

HAB. Maui, Lahaina (Baldwin); Haleakala at 9000 feet (Perkins).

(3) *Succinea bicolorata* Ancey.

*Succinea bicolorata* Ancey, P. Malac. Soc. London, III. (1899), p. 271, pl. XII. fig. 2.

HAB. Hawaii, Waimea (Ancey).

(4) *Succinea caduca* Mighels.

*Succinea caduca* Mighels, P. Boston Soc. II. (1845), p. 21; Gould, U. S. Explor. Exped. Mollusca, pl. II. fig. 30.

HAB. Oahu, Waianae Mts. (Baldwin).—Molokai Mts. (Perkins).—Lanai Mts. (Perkins).

(5) *Succinea canella* Gould.

*Succinea canella* Gould, P. Boston Soc. II. (1847), p. 184; U. S. Explor. Exped. Mollusca, pl. II. fig. 20; Bland and Binney, Ann. Lyc. New York, x. p. 338 [jaw and radula].

Mons. Ancey has named (Bull. Soc. Malac. France, VI. pp. 245—7) varieties *crassa*, *obesula*, *mamillaris*, and *lucida*.

HAB. Maui, Lahaina (Baldwin).—Molokai and Maui (Ancey).—Maui, Haleakala at 5000 feet; Molokai Mountains (Perkins).

(6) *Succinea casta* Ancey.

*Succinea casta* Ancey, P. Malac. Soc. London, III. (1899), p. 272, pl. XII. fig. 10.

HAB. Hawaii, Olaa (Ancey).

(7) *Succinea cepulla* Gould.

*Succinea cepulla* Gould, P. Boston Soc. II. (1847), p. 182; U. S. Explor. Exped. Mollusca, pl. II. fig. 15.

*Succinea fragilis* Souleyet, Voy. Bonite, Zool. II. (1852), p. 501, pl. XXVIII. figs. 18—20 [shell and animal: nec *S. fragilis* King].

*Succinea souleyeti* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 255.

The synonymy given here and under *S. rotundata* has been arrived at from a careful comparison of the original descriptions and figures, and a study of the identifications made by Pfeiffer amongst the specimens in the British Museum. The shell figured by Reeve (Conch. Icon. *Succinea*, fig. 69), purporting to be Hawaiian, under the name of *S. fragilis* King, is not the present species.

HAB. Hawaii (Gould, &c.).—Oahu, Tantalus, Head of Panoa Valley (Perkins).—Molokai Mountains (Perkins).

(8) *Succinea cinnamomea* Ancey.

*Succinea cinnamomea* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 247.

Plate XI. fig. 32.

HAB. Oahu, Waianae Mts. (Baldwin); Mount Kaala (Perkins).

(9) *Succinea delicata* Ancey.

*Succinea delicata* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 243.

HAB. East Maui (Ancey); Kula (Baldwin).

(10) *Succinea elongata* Pease.

*Succinea elongata* Pease, J. Conchyl. XVIII. (1870), p. 96.

A single specimen was found by Mr Perkins; the species was only known to me by the description. Authors refer to a *S. elongata* Beck, but I have failed to trace the reference.

HAB. Kauai (Pease); Waimea (Baldwin); Kaholuamano (Perkins).



(11) *Succinea explanata* Gould.

*Succinea explanata* Gould, U. S. Explor. Exped. Mollusca, p. 13, pl. II. fig. 31.

HAB. Kauai (Gould); North side (Baldwin).

(12) *Succinea garrettiana* Ancey.

*Succinea garrettiana* Ancey, P. Malac. Soc. London, III. (1899), p. 272, pl. XII. fig. 7.

HAB. Hawaii, Rainbow Falls, Hilo (Ancey).

(13) *Succinea inconspicua* Ancey.

*Succinea inconspicua* Ancey, P. Malac. Soc. London, III. (1899), p. 273, pl. XII. fig. 9.

HAB. Hawaii, Waimea (Ancey).

(14) *Succinea konaensis* Sykes.

*Succinea konaensis* Sykes, P. Malac. Soc. London, II. (1897), p. 299.

Plate XI. fig. 34.

HAB. Hawaii, Mount Kona at 4000 feet (Perkins).

(15) *Succinea lumbalis* Gould.

*Succinea lumbalis* Gould, P. Boston Soc. II. (1847), p. 183; U. S. Explor. Exped. Moll. pl. II. fig. 18.

HAB. Hawaii, Mauna Kea (Baldwin).—Kauai (Gould); Makaweli, and above Waimea at 4000 feet (Perkins).

The specimens from 'above Waimea' have a more drawn out spire, but only belong, I think, to a varietal form.

(16) *Succinea lutulenta* Ancey.

*Succinea lutulenta* Ancey, Bull. Soc. Malac. France, VI. (1889), p. 244.

HAB. Maui (Ancey); Ulupalakua (Baldwin).

(17) *Succinea mauiensis* Ancey.

*Succinea mauiensis* Ancey, Bull. Soc. Malac. France, vi. (1889), p. 248.

HAB. Maui (Ancey); Makawao (Baldwin); Haleakala at 5000 feet (Perkins).

(18) *Succinea newcombiana* Garrett.

*Succinea newcombiana* Garrett, P. Calif. Ac. 1. (1857), p. 103.

A species closely related to *S. cepulla* and *S. rotundata*, but, if my identification of the latter is correct, this is smaller, the mouth is rounder, and the last whorl not so much inflated.

HAB. Hawaii, district of Waimea (Garrett); Kohala Mountains (Perkins).

(19) *Succinea protracta* sp. nov.

Testa tenuis, aureo-rufa vel pallide-cornea, lineis incrementi obliquis bene notata; spira producta, apice acutulo, mamillato; anfr.  $3\frac{1}{2}$  convexi, sutura bene impressa discreti, rapide accrescentes: apertura ovato-pyriformis, fere recta; peristoma simplex, tenue, margine columellari arcuato, haud plicato. Long. 12.7, diam. maj. 6; alt. ap. 8, lat. ap. 5 mm.

Plate XI. fig. 25.

Belongs to the group of *S. aurulenta* Ancey, but is much more elongate and slender, and the suture is more impressed. A single white specimen from 'Mauna Loa at 3500' feet I also refer to this species.

HAB. Hawaii, Kau (Perkins).

(20) *Succinea punctata* Pfeiffer.

*Succinea punctata* Pfeiffer, P. Zool. Soc. London, 1854 [May, 1855], p. 297; Reeve, Conch. Icon. *Succinea*, fig. 29.

The specimens from Kohala Mts. are young and have the spire slightly more depressed, but appear to belong to this form. The white spots shewn in Reeve's figure are much exaggerated: most specimens have a few blotches of a paler tint, but I have seen none regularly spotted in the way the artist has represented them.

HAB. Hawaii (Pfeiffer); Kohala Mountains, Olaa Puna, and Kona at 3000 feet (Perkins).

(21) *Succinea rotundata* Gould.

*Succinea patula* Mighels, P. Boston Soc. II. (1845), p. 21 [nec *S. patula* Brug., nec King].

*Succinea rotundata* Gould, P. Boston Soc. II. (1847), p. 182; U. S. Explor. Exped. Moll. pl. II. fig. 14 [shell and animal].

*Succinea newcombi* Pfeiffer, P. Zool. Soc. London, 1854 [May, 1855], p. 297; Novit. Conch. I. pl. IX. figs. 3—5; Reeve, Conch. Icon. *Succinea*, fig. 61.

HAB. Oahu (Gould, &c.).—Molokai (Pfeiffer).—Hawaii, Kohala (Perkins).

See the remarks under *S. cepulla*, which species seems to be, like the present one, widely scattered over the islands.

(22) *Succinea rubella* Pease.

*Succinea rubella* Pease, P. Zool. Soc. London, 1871, p. 460.

The coloration of this species is very variable, and some specimens are found of a straw-colour; it appears to be close to *S. canella* Gould.

HAB. Lanai (Pease); Mountains (Perkins).

(23) *Succinea rubida* Pease.

*Succinea rubida* Pease, J. Conchyl. XVIII. (1870), p. 97.

HAB. Kauai (Pease); North side (Baldwin).

(24) *Succinea thaanumi* Ancey.

*Succinea thaanumi* Ancey, P. Malac. Soc. London, III. (1899), p. 273, pl. XII. fig. 3.

HAB. Hawaii, Olaa (Ancey).

(25) *Succinea venusta* Gould.

*Succinea venusta* Gould, P. Boston Soc. II. (1847), p. 186; U.S. Explor. Exped. Moll. pl. II. fig. 25.

HAB. Hawaii, Mauna Kea (Baldwin); Kona at 3000 feet, and Olaa Puna (Perkins).

The specimens from Kona are whitish and slightly more shouldered.

(26) *Succinea vesicalis* Gould.

*Succinea vesicalis* Gould, P. Boston Soc. II. (1847), p. 183; U.S. Explor. Exped. Moll. pl. II. fig. 17.

The figure given by Reeve (Conch. Icon. *Succinea*, fig. 85) does not represent this species.

HAB. Hawaii, Mauna Kea (Gould); Kau, and Mauna Loa at 2000 ft. (Perkins).

(27) *Succinea waianaensis* Ancey.

*Succinea waianaensis* Ancey, P. Malac. Soc. London, III. (1899), p. 273, pl. XII. fig. 12.

HAB. Oahu, Waianae Mts. (Ancey).

## SPECIES INSUFFICIENTLY KNOWN OR ERRONEOUSLY RECORDED.

*Succinea aperta* Lea. Unknown to me; it has been doubtfully referred to *S. rotundata*.

*Succinea approximata* Shuttleworth, Reeve, Conch. Icon. *Succinea*, fig. 27. Apparently really refers to the West Indian *S. approximans*.

*Succinea pudorina* Gould, Reeve, Conch. Icon. *Succinea*, figs. 43, 75.

Two apparently distinct species are figured by Reeve under this name; he records it, I think erroneously, from the 'Sandwich Islands.'

The following appear to be only manuscript names.

*S. apicalis* Ancey, Makawao, Maui.

*S. tenerrima* Ancey, Hilo, Hawaii.

## Fam. LIMNAEIDAE.

## LIMNAEA Lamarck.

*Limnaca* Lamarck, Mém. Soc. Hist. Nat. Paris, 1799, p. 75 (type *Helix stagnalis* L.).

The name *Limnaca* appears to have been used as early as 1791 by Poli for the animals of *Unio*, *Anodonta* and *Chama*; but his work is so peculiar, that I feel doubts if this can be regarded as preoccupying the name for a genus.



The question whether these forms—when sinistral—belong to *Physa* or *Limnaea*, has for long proved to be a difficult one. Gould, when describing his *Physa reticulata*, remarked "its form is so much that of a reversed *Limnaea* that I am almost tempted to consider it one." Pease, in his review of the Hawaiian species, stated that he was "confident," having examined the animals of several hundred specimens, that there was no species of *Physa* in the Islands. He also remarked that sinistral and dextral specimens of the same species may be found together. Prof. E. von Martens, in 1866, expressed the view, here adopted, that these Hawaiian forms were really sinistral species of *Limnaea*.

As shewing how little the literature has been studied, I may remark that as late as 1889 Mr Cooke (P. Zool. Soc. London, 1889, p. 142), when pointing out the affinities with *Limnaea* of the so-called *Physae* of Australia, notes that "Tryon mentions, but I have failed to trace on what authority, that sinistral Limnaeas occur in the Sandwich Islands."

Mighels described (P. Boston Soc. II. p. 21) two species, *producta* and *umbilicata*, as *Physae*: according to Pease the types were destroyed by fire and, as the species are unidentifiable from the diagnoses only, I have omitted them.

(1) *Limnaea aulacospira* Ancey.

*Limnaea aulacospira* Ancey, Naturaliste, (2) XI. (Dec. 1889), p. 290; Sykes, P. Malac. Soc. London, III. pl. XIII. fig. 19.

HAB. Maui (Ancey); Haleakala at 5000 feet, and Iao Valley (Perkins).

(2) *Limnaea binominis*, nom. nov.

*Physa sandwichensis* Clessin, Conchylien-Cabinet, *Physa*, p. 342, pl. XLVIII. fig. 7 (1886).

nec *Limnaea sandwichensis* Philippi.

HAB. Hawaiian Islands (Clessin).—Oahu, Mts. near Honolulu (Perkins).

(3) *Limnaea compacta* Pease.

*Limnaea compacta* Pease, Amer. J. Conch. VI. (1870), p. 6, pl. III. fig. 4.

*Limnaea ambigua*, Pease, t. c. p. 6, pl. III. fig. 5.

*Physa flavida* Clessin, Conchylien-Cabinet, *Physa*, p. 364, pl. LI. fig. 9 (1886).

HAB. Oahu (Pease).—(as *L. ambigua*) Kauai, Kapaa (Baldwin).—(as *L. compacta*) all the Islands (Baldwin).

(4) *Limnaea hartmanni* Clessin.

*Physa hartmanni* Clessin, Conchylien-Cabinet, *Physa*, p. 371, pl. LIV. fig. 9 (1886).

HAB. Hawaii (Clessin).

Some catalogues give a *Limnaea hartmanni* of Studer and of Charpentier, but I cannot trace a described *species* of that name; there appears to be a variety of *L. ovatus* Drap bearing the name.

(5) *Limnaea moreletiana* Clessin.

*Physa moreletiana* Clessin, Conchylien-Cabinet, *Physa*, p. 341, pl. XLVIII. fig. 3 (1886).

Unknown to me, but from the figure I think it may be a form of *L. turgidula* Pease. It appears not to be the *Limnaea moreletiana* Gassies, of Adams (Gen. Rec. Moll. II. p. 253).

HAB. Hawaiian Islands (Clessin).

(6) *Limnaea naticoides* Clessin.

*Physa naticoides* Clessin, Conchylien-Cabinet, *Physa*, p. 341, pl. XLVIII. fig. 5 (1886).

HAB. Hawaiian Islands (Clessin).

(7) *Limnaea oahuensis* Souleyet.

*Limnaea oahuensis* Souleyet, Voy. Bonite, Zool. II. (1852), p. 527, pl. XXIX. figs. 38—41 [with animal]; Reeve, Conch. Icon. *Limnaea*, sp. 90.

*Limnaea affinis* Souleyet, Voy. Bonite, Zool. II. p. 528, pl. XXIX. figs. 42—44.

*Limnaeus sandwichensis* Philippi, Arch. Naturg. II. (1845), p. 63; Kuster, Conchylien-Cabinet, *Limnaea*, p. 26, pl. IV. figs. 25, 26.

*Limnaea volutata*, Gould, P. Boston Soc. II. (1847), p. 211; U. S. Explor. Exped. Moll. pl. IX. fig. 142.

I defer to Pease's experience and unite Souleyet's two species; though, from the figures, I should have regarded them as distinct. It is not the *Limnaea affinis* of Beck.

HAB. Oahu (Souleyet, Pease, &c.).—Oahu and Maui (Baldwin).

(8) *Limnaea peasei* Clessin.

*Physa peasei* Clessin, Conchylien-Cabinet, *Physa*, p. 339, pl. XLVII. fig. 8 (1886).

Judging from specimens received by the British Museum from the Morelet collection, the figure is by no means good.

HAB. Hawaiian Islands (Clessin).

(9) *Limnaea reticulata* Gould.

*Physa reticulata* Gould, P. Boston Soc. II. (1847), p. 214; U. S. Explor. Exped. Moll. pl. ix. fig. 140; Sowerby, Conch. Icon. *Physa*, fig. 56; Clessin, Conch.-Cab. *Physa*, p. 330, pl. XLVI. fig. 4.

*Limnaea reticulata* Gould, Pease, Amer. J. Conch. VI. p. 5.

Neither Sowerby nor Clessin appears to have been aware of Gould's published description of this species.

HAB. Kauai (Pease).

(10) *Limnaea rubella* Lea.

*Lymnaeus rubellus* Lea, Tr. Amer. Phil. Soc. IX. (1843), p. 12.

*Limnaea rubella* Lea, Pease, Amer. J. Conch. VI. p. 5, pl. III. figs. 1—3.

Pease was of opinion that this might prove to be a variety of *L. oahuensis* Soul.

HAB. Oahu (Lea).—Kauai (Pease); Mts. between Lihue and the sea, also Wailua river (Perkins).

(11) *Limnaea turgidula* Pease.

*Limnaea turgidula* Pease, Amer. J. Conch. VI. (July, 1870), p. 5, pl. III. fig. 3.

HAB. Oahu (Pease).

## ERINNA A. ADAMS.

*Erinna newcombi* A. Adams.

*Erinna newcombi* A. Adams, P. Zool. Soc. London, 1855, p. 120; H. and A. Adams, Gen. Rec. Moll. II. p. 644, pl. CXXXVIII. fig. 9; Bland and Binney, Ann. Lyc. New York, X. p. 349 [jaw and radula]; Binney, P. Ac. Philad. 1874, p. 54, pl. v. figs. 7—10 [jaw and radula].

HAB. Kauai, Hanalei River (Baldwin, &c.). H. and A. Adams give as locality "Henata River, Kami."

See also a note on the genus by Dr Jousseaume, Rev. Mag. Zool. (3) II. (1874), p. 25.

## ANCYLUS, Geoffroy.

*Ancylus* Geoffroy, Traité sommaire des coquilles,.....aux environs de Paris, 1767, p. 122 [type apparently *A. lacustris*].

*Ancylus sharpi* sp. nov.

Testa pygmaea, convexiuscula, hyalino-flavida; apertura elongato-elliptica, apice obtusulo. Long. 2; lat. 1.1; alt. .8 mill.

Plate XII. figs. 14, 14 a.

An insignificant little form with no striking characters; there being no other species recorded from the Islands, I venture to give these shells a name; they are probably not adult.

HAB. Oahu, on pali, head of Nuuanu Valley (Coll. Dr B. Sharp, commisit H. A. Pilsbry).

## Fam. MELANIIDAE.

## MELANIA Lamarck.

The genus appears to have been first put forward by Lamarck in 1799 (Mém. Soc. Hist. Nat. Paris, p. 75) and to have been also characterised by him in 1801 (Syst. An. sans Vert. p. 91). In both cases the species named by him was *Melania amarula* Lam., which is therefore the type.

(1) *Melania baldwini* Ancey.

*Melania baldwini* Ancey, P. Malac. Soc. London, III. (July, 1899), p. 273, pl. XII. fig. 6.

HAB. Maui, Lahaina (Ancey).

(2) *Melania indefinita* Lea.

*Melania indefinita* Lea, P. Zool. Soc. London, 1850, p. 187; Reeve, Conch. Icon. *Melania*, fig. 56; Brot, Conch.-Cab. *Melania*, pl. XXIII. fig. 7.

*Melania newcombii* Lea, Pease, Amer. J. Conch. VI. p. 6 [nec Lea, fide Brot].

HAB. Oahu (Pease).

The Philippine specimens in coll. Cuming seem identical with some from Oahu, named *M. newcombii* by Pease.



(3) *Melania kauaiensis* Pease.

*Melania kauaiensis* Pease, Amer. J. Conch. vi. (July 1870), p. 7, pl. iii. fig. 6.

HAB. Kauai (Pease).—Molokai, Pelekunu (Perkins).

Probably the species of *Melania* are scattered over the various islands and not confined to any single locality; *M. mauiensis*, for example, has been found on Maui, Molokai, Kauai, and Oahu.

(4) *Melania mauiensis* Lea.

*Melania mauiensis* Lea, P. Ac. Philad. viii. (1857), p. 145; Brot, Conch.-Cab.

*Melania*, p. 322, pl. xxxiii. figs. 7, 8, 8 a.

HAB. Maui (Lea).—Maui, Oahu, Kauai (Pease).—Maui, Molokai (Brot).—Molokai, in taro patches, Pelekunu (Perkins).

Large specimens were found on Molokai by Mr Perkins, exact spot not recorded, and a small race, kindly identified for me by the late Dr Brot, on Pelekunu. *Melania tahitensis* Pease MS. is stated by Brot to be a synonym. Schepman (Notes Leyden Mus. xiv. p. 158) has recorded the present species from the Island of Soemba.

(5) *Melania newcombii* Lea.

*Melania newcombii* Lea, P. Ac. Philad. viii. (1857), p. 145; Brot, Conch.-Cab.

*Melania*, p. 213, pl. xxiv. figs. 2, 2 a.

*Melania contigua* Pease, Amer. J. Conch. vi. (July 1870), p. 7.

I follow Brot in uniting *M. contigua* Pease; he also places *M. oahuensis* Pease MS. and *M. paulla* Dunker MS. in the synonymy.

HAB. Oahu (Lea); In stream in mountain gulch near Honolulu (Perkins).—Kauai (Pease).

(6) *Melania verreauxiana* Lea.

*Melania verreauxiana* (sic) Lea, P. Ac. Philad. viii. (1857), p. 144.

*Melania verreauxiana* Lea, J. Ac. Philad. n. s. vi. pl. xxii. fig. 27; Brot, Conch.-Cab. *Melania*, p. 32, pl. iv. fig. 2.

Unknown to me and may not really be Hawaiian. Dr Brot considered it might be a form of *M. largillierti* Phil.

HAB. Hawaiian Islands (Lea).

## Fam. PALUDESTRINIDAE.

## PALUDESTRINA D'Orbigny.

*Paludestrina porrecta* Mighels.

*Paludina porrecta* Mighels, P. Boston Soc. II. (1845), p. 22.

HAB. Oahu (Mighels).

## Fam. HELICINIDAE.

## HELICINA Lamarck.

In 1799 (Mém. Soc. Hist. Nat. Paris, p. 77) the genus was described but no type or species named; in 1801 (Syst. An. sans Vert. p. 94) the only species named was *Helicina neritella* Lam., which may be taken as the type. Lamarck refers for a figure to Lister (Hist. Conch. fig. 59), and this illustration appears to represent a *Helicina*, though it is hard to be certain whether it be *H. neritella* or not.

(1) *Helicina laciniosa* Mighels.

*Helicina laciniosa* Mighels, P. Boston Soc. II. (1845), p. 19; Gould, U. S. Explor. Exped. Moll. pl. VII. fig. 108.

A very variable shell in size and coloration; it appears to be always more compact and elevated than *H. sandwichiensis*.

HAB. Oahu (Mighels).—Kauai (Baldwin).—Lanai, behind Koele; also Kalamaula, Molokai; Kaala, Oahu; and between Lihue and the sea, Kauai (Perkins).

(2) *Helicina magdalenae* Ancey.

*Helicina magdalenae* Ancey, Bull. Soc. Malac. France, VII. (1890), p. 342.

*Helicina constricta* Pfeiffer, P. Zool. Soc. London, 1848, p. 120; Conch.-Cab.

*Helicina*, p. 22, pl. VII. fig. 37—9 [both relate to his variety only].

Pfeiffer's typical form came from 'Otaheite' and appears to belong to a different species to his variety, which seems to be identical with this. Possibly forms may be found linking *H. magdalenae* to *H. uberta*.

HAB. Oahu, Tantalus (Ancey).

(3) *Helicina rotelloidea* Mighels.

*Helicina rotelloidea* Mighels, P. Boston Soc. II. (1845), p. 19; Pfeiffer, Conch.-Cab. *Helicina*, p. 23, pl. III. fig. 40—3.

*Helicina bronniana* Philippi, Zeitsch. Malak. IV. (1847), p. 124.

HAB. Oahu (Mighels, &c.).

(4) *Helicina sandwichiensis* Souleyet.

*Helicina sandwichiensis* Souleyet, Voy. Bonite, Zool. II. (1852), p. 529, pl. xxx. figs. 1—5.

nec ? *H. sandwichiensis* Sowerby, Thes. Conch. III. pl. CCLXX. figs. 173—4.

A variety “ $\beta$ ” has been recorded by Pfeiffer as from the Loyalty Islands; probably this is an error. See Crosse, J. Conchyl. XLII. p. 405.

HAB. Oahu, Waianae Mts. (Baldwin); at and below Kaala (Perkins).

(5) *Helicina uberta* Gould.

*Helicina uberta* Gould, P. Boston Soc. II. (1847), p. 202; U. S. Explor. Exped. Moll. pl. VII. fig. 114.

HAB. Maui and Oahu (Gould).—Oahu, below Kaala (Perkins).

## SPECIES DOUBTFUL OR ERRONEOUSLY RECORDED.

*Helicina antoni* Pfeiffer. Originally recorded without locality; subsequently Pfeiffer gave the Hawaiian Islands and the Gambiers. It really appears to come from Honduras, and the Hawaiian habitat is probably erroneous, these supposed Hawaiian specimens belonging, as undoubtedly the Gambier Island shells do, to *H. pazi* Crosse (J. Conchyl. XIII. p. 221, pl. VI. fig. 8).

*Helicina crassilabris*, Philippi. It has been suggested by Pfeiffer that this is Hawaiian, but it really comes from Venezuela or the Caribbean Region.

*Helicina fulgora* Gould, originally described from Manua, Samoa Islands; it has also been noted, but, I think, erroneously, from the Hawaiian Islands.

*Helicina pisum* Philippi. I think “Sandwich Is.” must have been a mistake and possibly refers to Vate or Sandwich I.: it may be a slip for Savage I., from which specimens, inseparable from this, undoubtedly do come. This appears not to be the *H. pisum* Hombr. and Jacq., which equals *H. tahitensis* Pease.

## Fam. NERITIDAE.

## NERITINA Lamarck.

I have not seen the first Edition of the 'Philosophie Zoologique' (1809) in which this genus is said to occur, but in the second edition (1830) the name appears in French only, with no diagnosis or named species (Vol. i. p. 321). However in his 'Hist. An. sans Vert.' it is duly given in Latin with named species (Vol. vi. pt. 2, p. 182). The first is *N. perversa* Gmel., which is the type of Montfort's *Velates* (1810) under the more correct name of *V. conoidea*, but the others belong to *Neritina* as we understand it to-day.

(1) *Neritina cariosa* Gray.

*Nerita cariosa* Gray, Wood, Index Test. Suppl. *Nerita* fig. 9 (1828).

*Neritina sandwichensis* Deshayes, An. sans Vert. Ed. 2, VIII. (1838), p. 579.

*Neritina convexa* Nuttall, Jay, Cat. Shells, Ed. 3, 1839, p. 66 (nom. sol.).

*Neritina nuttalli* Recluz, Rev. Zool. 1841, p. 276; Souleyet, Voy. Bonite, Zool. II. pl. xxxiv. figs. 43—46.

*Neritina solidissima* Sowerby, Thes. Conch. II. p. 541, pl. cxvi. fig. 573.

I have not sufficient material to determine whether the large synonymy given by Tryon (Man. Conch. x.) is fully justified. Prof. von Martens (Conch.-Cab. *Neritina*) expressed the opinion (p. 276) that *Neritina cariosa* Gray does not really belong here, but is a form of *N. mauritii*: this has been dealt with by Mr Smith (P. Zool. Soc. London, 1884, p. 275).

HAB. Hawaiian Islands (various authors).—Maui and Oahu (Baldwin).—Hawaii, Hilo (Smith).

(2) *Neritina granosa* Sowerby.

*Neritina granosa* Sowerby, Tank. Cat. App. p. xi. (1825); Conch. Ill. *Neritina* fig. 6.

*Neritina papillosa* Jay, Cat. Shells, Ed. 2, 1839, pl. iv. fig. 11.

*Neripteron gigas* Lesson, Rev. Zool. 1842, p. 187.

HAB. All the Islands (Baldwin).—Molokai, Pelekunu (Perkins).

(3) *Neritina lugubris* Philippi.

*Neritina lugubris* Philippi, Abbild. Conchylien, I. pt. 2, p. 20, pl. I. fig. 9 (1845).

This has been placed as a synonym of *N. cariosa*, but from the description and figure it seems to be distinct.

HAB. Hawaiian Islands (Philippi).



(4) *Neritina neglecta* Pease.

*Neritina neglecta* Pease, P. Zool. Soc. London, 1860, p. 435.

HAB. Hawaiian Islands (Pease).

(5) *Neritina vespertina* Nuttall.

*Neritina vespertina* Nuttall, Jay, Cat. Shells, Ed. 3, 1839, p. 66 (nom. sol.);  
Reeve, Conch. Icon. *Neritina*, sp. 61.

? *Neritina sandwichensis* Desh., Reeve, Conch. Icon. sp. 82 [nec Deshayes].

HAB. All the Islands (Baldwin).

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In conclusion I may call attention to three species, attributed to the Islands, which do not really belong to their fauna.

*Partula terrestris* Pease. Apparently a manuscript name; it has appeared in Paetel's 'Catalog' and in the Mon. Helic. Viv. (Vol. VIII. p. 209) with the habitat of 'I. Sandwich.' According to Dr Hartman, it is a synonym of *P. approximans* Pease, from Raiatea.

*Spiraxis sandwicensis* was described by Pfeiffer (P. Zool. Soc. London, 1856, p. 335) as from the Hawaiian Islands. It appears to me to be a form of the *Bulinus lactifluus* of Pfeiffer, described from Chili, and I feel no doubt the Hawaiian habitat is erroneous.

*Bulinus kauaiensis* was described by Pfeiffer in the same volume (p. 332). It is probably also Chilian and very close to *Bulinus albicans* Brod.; but I am not quite sure of the identity, as the shell is slightly more succineiform.

Finally, it may be noted that a specimen of *Viviparus chinensis* Gray, doubtless imported for food, was collected by Mr Perkins at "Wailuku," Maui.

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<sup>1</sup> The sheet is certified by a note in the volume, dated Feb. 6, 1888 (*sic*), signed E. J. Nolan, to have been presented on Oct. 23, 1888.



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§ 4. List of named forms which are placed in this work as varieties or synonyms.

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- Figs. 37, 38. *Endodonta* (*Nesophila*) *lanaiensis* Sykes (p. 291).
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- Figs. 41, 42. *Philonesia perkinsi* Sykes (p. 284).
- Figs. 43, 44. *Vitrea lanaiensis* Sykes (p. 278).
- Figs. 45, 46. *Vitrea molokaiensis* Sykes (p. 278).



*J. Green, del et lith.*

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## DESCRIPTION OF PLATE XII. (VOL. II.)

### MOLLUSCA.

#### PHILONESIA BALDWINI Ancey (p. 281).

- Fig. 1. Mantle margin, with shell and dorsal lobes. *a*, denotes white spots on integument covering the branchial cavity.  
 Fig. 2. Extremity of foot from left side.  
 Fig. 2 *a*. Portion of foot showing sole.  
 Fig. 3. Genitalia, not quite complete.  
 Fig. 3 *a*. Male organs enlarged, to show the retractor muscle and coiled vas deferens.  
 Fig. 4. Jaw.  
 Fig. 5. Centre and two side teeth of radula.  
 Fig. 5 *a*. Median teeth, 7th—11th.  
 Fig. 5 *b*. Lateral teeth, 19th—22nd.  
 Fig. 5 *c*. Eleven of the outermost, or marginal, teeth.

#### GODWINIA CAPERATA Gould (p. 277).

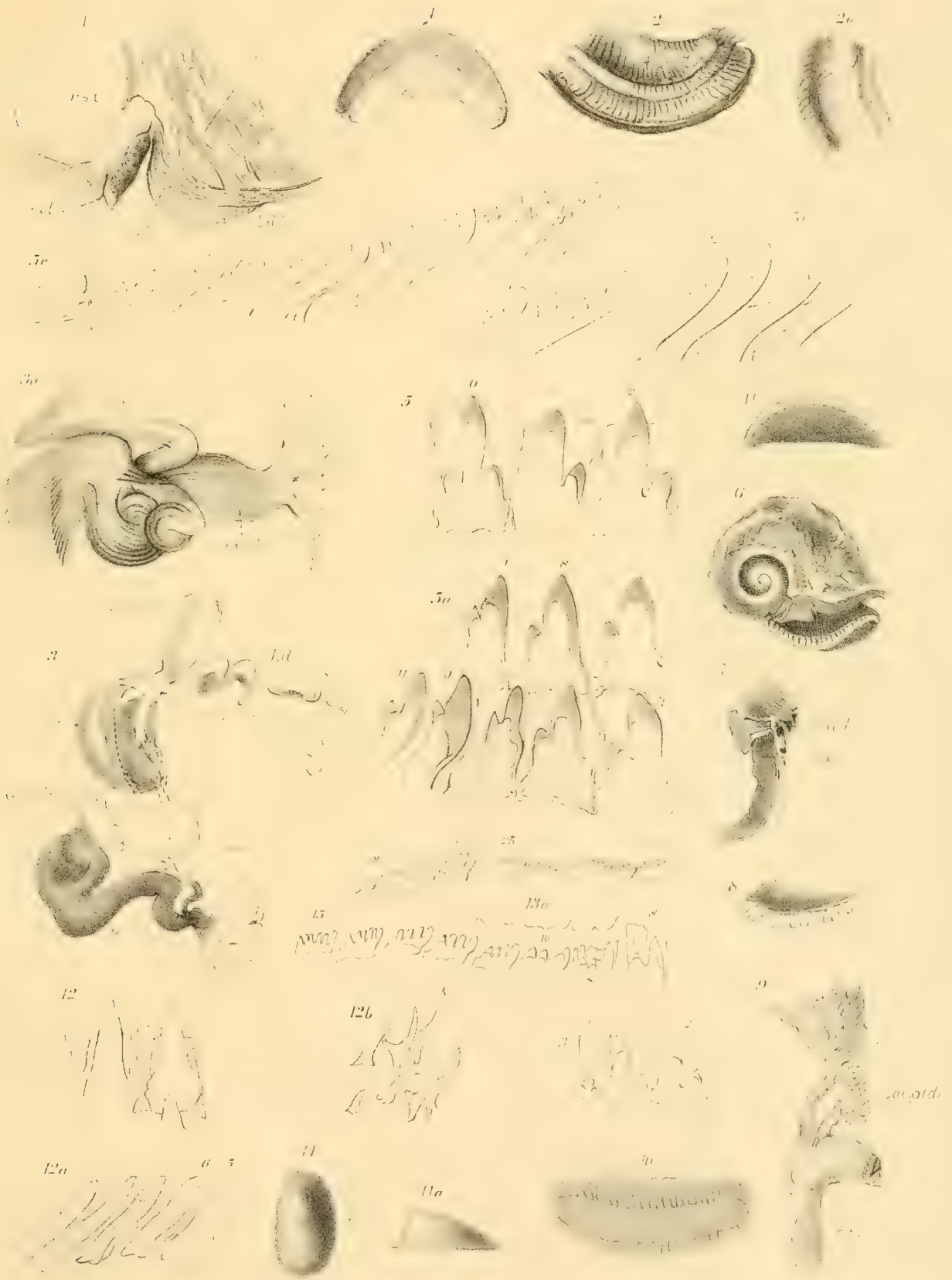
- Fig. 6. Animal with shell removed, showing dorsal lobes.  
 Fig. 7. Portion of mantle zone, near respiratory orifice.  
 Fig. 8. Extremity of foot.  
 Fig. 9. Buccal mass, and salivary gland, &c.  
 Fig. 10. Sole of foot.  
 Fig. 11. Jaw.  
 Fig. 12. Central tooth of radula.  
 Fig. 12 *a*. Fifth intermediate, and following lateral teeth.  
 Fig. 12 *b*. Outermost, or marginal, teeth.

- Fig. 13. *Leptachatina acuminata* Gould. Central teeth of radula (p. 357).  
 Fig. 13 *a*. Intermediate and marginal teeth.  
 Figs. 14, 14 *a*. *Ancylus sharpi*, sp. nov. (p. 394).

#### EXPLANATION OF THE LETTERING.

<i>Al. Gd.</i> albumen gland.	<i>pr.</i> prostate.
<i>B. m.</i> muscle of buccal mass.	<i>r. d. l.</i> right dorsal lobe.
<i>Gen. ap.</i> generative aperture.	<i>r. m. P.</i> retractor muscle of penis.
<i>h. d.</i> hermaphrodite duct.	<i>r. s. l.</i> right shell lobe.
<i>i.</i> intestine.	<i>Sal. gland.</i> salivary gland.
<i>l. d. l.</i> left dorsal lobe.	<i>st.</i> stomach.
<i>l. s. l.</i> left shell lobe.	<i>v. d.</i> vas deferens.
<i>P.</i> male organ.	

The numerical digits in smaller type indicate the tooth figured, reckoning from 0, the central tooth.  
 All figures (except 14, 14 *a*) are from dissections and drawings made by Lt.-Col. H. H. Godwin-Austen, F.R.S.



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